

## PART FOUR: ENVIRONMENTAL IMPACTS

### METHODOLOGY

This section describes the sources of data and defines the threshold terms used to assess impacts for each resource. In the absence of definitions specific to a particular resource, the following standard definitions are used:

- *Negligible*: The impact is at the lower levels of detection, or less than an approximate 1% change will occur over the life of the plan.
- *Minor*: The impact is slight, but detectable; or an approximate 1–10% change would occur over the life of the plan.
- *Moderate*: The impact is readily apparent, and has the potential to become major; or an approximate 11–20% change would occur over the life of the plan.
- *Major*: The impact is severe, or a greater than approximate 20% change would occur over the life of the plan.

The term "localized impact" refers to impacts confined to the study area or a portion of it (e.g., the actual location where vegetation is removed). When comparing changes to existing conditions or to No Action, impacts were often only easily detectable on a localized basis. For instance, removing pavement and allowing native vegetation to repopulate a few acres on the base may have a readily apparent or moderate impact in that location or even base-wide. However, compared to the thousands of acres of similar vegetation on the entire peninsula or in the region, the change would be less than 1%, or negligible. The impacts are often analyzed both locally and regionally to provide two separate contexts to understand the relative magnitude.

### IMPACT ANALYSIS METHOD

*Management Policies 2001* (NPS 2000d) require analysis of potential effect to determine whether or not actions would impair recreation area resources or values.

The fundamental purpose of the National Park System, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, actions that would adversely affect park resources and values.

Although Congress has given the National Park Service (NPS) the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement (enforceable by the federal courts) that NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

The impairment that is prohibited by the Organic Act and the General Authorities Act is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. As noted in the conclusions of the Impacts sections, no impairment of any park resource or value is expected from implementing any alternative.

An impact on any park resource or value may constitute impairment. However, an impact would be most likely to constitute impairment if it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Acadia National Park;
- Key to the natural or cultural integrity of Acadia National Park or to opportunities for enjoyment of Acadia National Park; or
- Identified as a goal in Acadia's general management plan or other relevant NPS planning documents.

A determination of impairment is included in the impact analysis section for all cultural and natural impact topics relating to Acadia National Park resources and values. It is based on the impact–topic–specific definition of impairment that is provided in the methodology section for each impact topic. The following process was used to determine whether the alternatives had the potential to impair park resources and values:

1. The park’s enabling legislation, the *General Management Plan*, the *Strategic Plan*, and other relevant background were reviewed with regard to the unit’s purpose and significance, resource values, and resource management goals or desired future conditions.
2. Management objectives specific to resource protection goals at the park were identified.
3. Thresholds were established for each resource of concern to determine the context, intensity, and duration of impacts.
4. An analysis was conducted to determine if the magnitude of impact reached the level of “impairment,” as defined by NPS Management Policies.

Cumulative impacts are defined as those impacts resulting from an alternative which add to past, present, or reasonable future impacts to the same resource. For example, air quality in the park is affected by stationary and mobile sources originating in the midwestern United States. These have an additive or cumulative effect on the much more minor impacts of car traffic in the study area, and so are included in the analysis.

## **NATURAL RESOURCES**

### **Air Quality**

The air resource program at Acadia National Park, which began in the early 1980s, includes monitoring, research, and regulatory interaction with state and federal agencies. Core program elements include long-term monitoring for ozone, sulfur dioxide, nitrogen oxides, volatile organic compounds, fine particulates, visibility, mercury deposition, acid precipitation, and ultraviolet radiation. In addition, there is an

ongoing effort to determine the biological effects of selected air pollutants on park resources. The air resource program at Acadia National Park is a collaborative effort involving the NPS Air Resources Division and Northeast Regional Office, the Maine Department of Environmental Protection, and park natural resource staff. In addition, there are a number of other important partnerships with the U.S. Geological Survey, Environmental Protection Agency, universities, and other state and regional agencies for conducting air-related research and monitoring at Acadia National Park.

Ground-level ozone has been monitored at Acadia National Park since 1982 at McFarland Hill and since 1995 at Cadillac Mountain. Sulfur dioxide was monitored continuously at the park from 1988 through 1991. Acadia National Park discontinued continuous monitoring due to consistently low ambient levels, less than 0.02 ppm. Sulfur dioxide is currently monitored bi-weekly as part of the IMPROVE fine particulate monitoring program. In 1995, the Maine Department of Environmental Protection established a Photochemical Assessment Monitoring Site on Cadillac Mountain. The site includes continuous monitoring for NO<sub>x</sub>, VOCs, ozone, and meteorological parameters. A number of key meteorological parameters are monitored at both the McFarland Hill and Cadillac Mountain sites, including wind speed and direction, relative humidity, temperature, solar radiation, and rainfall. In addition to providing data essential to assessing the basic ecological integrity of park ecosystems, meteorological data are also used in various modeling applications (e.g., back trajectory analysis) to determine potential air pollution sources and source areas. Fine Particulate Monitoring has been conducted since 1987 as part of the IMPROVE program. This program involves weekly sampling of fine particulates in the 0–2.5 (PM<sub>2.5</sub>) and 0–10 (PM<sub>10</sub>) micron size ranges, and analyzes for mass volume, elemental compounds (H, Na–Pb), nitrate, sulfate, organic and elemental carbon.

Acadia National Park is one of more than 200 sites nationwide that participates in the National Atmospheric Deposition Program (NADP). NADP, which began in 1978, is a long-term program to determine the chemical composition of atmospheric precipitation, and

the spatial and temporal trends of deposition. The park site is one of four NADP sites in Maine and is operated in cooperation with Maine Department of Environmental Protection. Since 1998 wet and dry deposition of mercury have also been monitored at the parks as part of the national Mercury Deposition Network.

In addition to these sources of information, the analysis used a transportation assessment study (U.S. Department of Transportation 2002) that identified how many cars use the peninsula roads now, and the expected offset of bike lanes, ferries, and buses. The NPS has also monitored automobile traffic and completed a set of approximate calculations to estimate the changes the closure of the base by the U.S. Navy brought, as well as those each alternative might bring. Average emissions from mobile sources were calculated using national vehicle and fuel emissions laboratory estimates (Environmental Protection Agency 2000).

The following definitions of thresholds were used in the air quality analysis:

- **Negligible:** The impact is at the lower levels of detection; adverse or positive impacts are likely to be less than about 1% change from No Action.
- **Minor:** The impact is slight but detectable; no standards are violated. Adverse or positive changes are likely to be in the 1–10% range.
- **Moderate:** The impact may exceed standards on a local and short-term basis, or is readily apparent. Adverse or positive changes are likely to be in the 10–20% range.
- **Major:** The alternative would result in sustained exceedances of air quality standards, or contribute to an obvious and permanent adverse change or improvement in local or regional conditions.
- **Impairment:** Impairment is defined as impacts that
  - have a major adverse effect on park air quality and values,

- contribute to deterioration of the park’s resources to the extent that its purpose could not be fulfilled as established in its enabling legislation,

- affect resources key to the park’s natural or cultural integrity or opportunities for enjoyment, or

- affect the resource whose conservation is identified as a goal in the park’s *General Management Plan* or other park planning documents.

### Water Resources

Information from existing agency reports prepared by both the U.S. Navy and NPS were used to assess existing water supply and wastewater disposal facilities and capacity, as well as to identify the locations and extent of water features (bogs, streams, etc.). The degree of change in water supply or wastewater was based on the number of program participants and staff occupying the base and compared to day use of the facility by the U.S. Navy.

The following thresholds were used in assessing impacts to water resources:

- **Negligible:** The impact to water features is at the lower limits of detection. A less than 1% change in water quality or water supply would result.
- **Minor:** The impact to water features is slight but detectable. A change of 1–10% in water quality or water supply would result from actions in the alternative.
- **Moderate:** The impact to water features is apparent, but is either temporary, localized, or for other reasons is not a major concern. A change of 11–20% in water quality or water supply would result from actions in the alternative.
- **Major:** The impact to water features is obvious and a significant problem, resulting in damage on a study-area scale, or severe and irreversible localized impacts. A change of more than about 20% in water quality of water supply actions would result from actions in the alternative.

- **Impairment:** Chemical or physical changes to water quality would be detectable and would be substantially and frequently altered from the historical baseline or desired water quality conditions and/or water quality standards. The impacts would involve deterioration of the park's water quality and water resources over the long term, to the point that the park's purpose could not be fulfilled, or resources could not be experienced and enjoyed by future generations.

## Soils

Information from agency reports, and in particular the *Schoodic Peninsula, Acadia National Park, Visitor Study 2000–2001* (Manning et al. 2002), was used to assess impacts to soils on trails. Increased use of those trails over the 10–15 year life of the plan was assumed to increase impacts to soils similarly. The standard definitions of impacts identified at the beginning of this section were applied in assessing impacts.

Impairment is defined as impacts that:

- have a major adverse effect on park resources and values,
- contribute to deterioration of the park's resources to the extent that its purpose could not be fulfilled as established in its enabling legislation,
- affect resources key to the park's natural or cultural integrity or opportunities for enjoyment, or
- affect the resource whose conservation is identified as a goal in the park's *General Management Plan* or other park planning documents.

## Vegetation

Information from the visitor survey identified above was used to assess impacts to vegetation along monitored trails. Additional reports cited in Part Three: Affected Environment, and anecdotal data supplied by park staff and other professionals, were used to identify vegetation types in areas where impacts from additional visitor use, or from building removal or rehabilitation, might be expected.

The following thresholds were used to assess impacts:

- **Negligible:** The impact is at the lower levels of detection (a less than 1% change) in the short and long term. No protected species or habitats are affected either positively or negatively.
- **Minor:** The impact is slight but detectable (a 1–10% change) in the short term, and/or at the lower levels of detection (a less than 1% change) in the long term. Effects on special-status species are discountable (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated) or are completely beneficial. A finding of “may affect/not likely to adversely affect” is likely from the U.S. Fish and Wildlife Service (USFWS).
- **Moderate:** The impact is readily apparent (an approximate 11–20% change) in the short term, and/or slight but detectable (a 1–10% change) in the long term. Effects on special-status species are discountable (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated) or are completely beneficial. A finding of “may affect/not likely to adversely affect” is likely from the USFWS.
- **Major:** The impact is severe (a greater than 20% change) in the short term and/or readily apparent (an approximate 11–20% change) in the long term, or vegetation in the study area would experience an obvious and permanent beneficial effect. An adverse effect to a listed protected species may occur as a direct or indirect result of actions in an alternative and the effect is not discountable or is completely beneficial. A finding of “may affect/likely to adversely affect” from the USFWS is likely.
- **Impairment:** Actions in an alternative would contribute substantially to the deterioration of park vegetation to the extent that the vegetation would no longer function as a natural system. In addition, these adverse major impacts to park resources and values would:

- contribute to deterioration of these resources to the extent that the park's purpose could not be fulfilled as established in its enabling legislation,
- affect resources key to the park's natural or cultural integrity or opportunities for enjoyment, or
- affect the resource whose conservation is identified as a goal in the park's general management plan or other park planning documents.

The alternative would jeopardize the continued existence of a protected species or adversely modify habitat critical to a species within or outside park boundaries. A finding of "likely to jeopardize protected or proposed species/ adversely modify critical habitat" from the USFWS is likely.

#### Coastal Resources

The literature was consulted to identify the types of coastal plants and animals in the study area, as well as the types of impacts actions in the alternatives might cause. The extent of impacts on stationary coastal resources was assumed to be directly related to the quantity and type of visitor use it would receive. The standard definitions of thresholds were used to assess impacts.

Impairment is defined as impacts that:

- have a major adverse effect on park resources and values,
- contribute to deterioration of the park's resources to the extent that its purpose could not be fulfilled as established in its enabling legislation,
- affect resources key to the park's natural or cultural integrity or opportunities for enjoyment, or
- affect the resource whose conservation is identified as a goal in the park's *General Management Plan* or other park planning documents.

#### Wildlife

The literature and agency reports were used to determine the types and magnitude of impacts likely to result from the types of actions under each alternative. Quantitative estimates on the amount of increase in visitation were available from the NPS regional office staff; these increases were not assumed to have the same increase in impact on wildlife. For example, a 5% increase in visitation is not always equal to a 5% increase in impact on wildlife, as wildlife species are mobile and much of the peninsula is in relatively undisturbed condition, allowing for free movement and relocation. In addition, a 5% increase in relatively poor-quality wildlife habitat would have relatively small impacts, whereas a similar increase in undisturbed habitat, or where sensitive species reside, could have a major effect on some individuals. Surveys of wildlife conducted in the mid-1990s in the study area (Mittelhauser et al. 1995, Mittelhauser et al. 1996) were particularly well used. The Maine Natural Areas Program provided data on rare, threatened, and endangered plant and animal species, and habitats of special concern to the state.

The following definitions were used to assess impacts to wildlife:

- **Negligible:** The impact to non-protected wildlife is at the lower levels of detection in the short or long term. No protected species are affected.
- **Minor:** The impact to non-protected wildlife is slight but detectable in the short term and at the lower level of detection in the long term. Only non-breeding animals are present, or proposed mitigation to breeding animals will fully offset impacts to these individuals. Effects on special-status species are discountable (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated) or are completely beneficial. A finding of "may affect/not likely to adversely effect" is likely from the USFWS.
- **Moderate:** The impact to non-protected wildlife is readily apparent in the short term and/or slight but detectable in the long term. Actions may interfere with activities neces-

sary for survival or breeding on an occasional or short term basis, but are not expected to threaten the continued existence of the species in the park. Effects on special-status species are discountable (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated) or are completely beneficial. A finding of “may affect/not likely to adversely effect” is likely from the USFWS.

- **Major:** The impact to non-protected wildlife is severe in the short term, or readily apparent or severe in the long term. Mortality or other effects are expected on a regular basis and could threaten continued survival of the species in the park. An adverse effect to a listed protected species may occur as a direct or indirect result of actions in an alternative and the effect is not discountable or is completely beneficial. A finding of “may affect/likely to adversely affect” from the USFWS is likely.
- **Impairment:** Some of the major impacts described above might be an impairment of park resources if their severity, duration, and timing resulted in the elimination of a native species or significant population declines in a native species, or they precluded the park’s ability to meet recovery objectives for listed species. In addition, these adverse, major impacts to park resources and values would:
  - contribute to deterioration of the park’s wildlife resources and values to the extent that the park’s purpose could not be fulfilled as established in its enabling legislation,
  - affect resources key to the park’s natural or cultural integrity or opportunities for enjoyment, or
  - affect the resource whose conservation is identified as a goal in the park’s general management plan or other park planning documents.

The alternative would jeopardize the continued existence of a protected species or adversely modify habitat critical to a species within or outside park boundaries. A finding of “likely to jeopardize protected or proposed species/adversely modify critical habitat” from the USFWS is likely.

## **CULTURAL RESOURCES**

A review of relevant resource materials regarding cultural resources at the Schoodic District, as well as communications with park staff, was completed to identify and evaluate potential impacts to historic properties located within the study area. The most recent cultural resource study in the general area was performed on former navy base properties in and around the Schoodic Peninsula (Berger & Assoc., Inc. 1999). A review of previously conducted cultural resource work in the general area is summarized in that document. A cultural landscape inventory and National Register nomination are underway. The U.S. Navy completed nominations to the National Register of Historic Place for the Rockefeller Building and powerhouse located on the former navy base (September 2001).

The following assumptions were used in the impact analysis for cultural resources located within the Schoodic Peninsula:

- Visitors accessing the former navy base under all alternatives would use the existing Schoodic Loop Road.
- A user's destination point on the former navy base under all alternatives does not preclude their visiting other areas of the peninsula (trails, parking, restrooms), and, in fact, would likely encourage it. In addition, it is assumed that program participants visiting the former navy base have an indirect influence on other non-participants visiting the Schoodic District.

Since no comprehensive cultural landscape inventory exists for the entire Schoodic District, the degree of impact (beneficial or adverse) is not always quantifiable for proposed actions. In this case, a range of potential impacts/benefits may be presented.

The term "ineligible" refers to cultural resources not considered eligible for the National Register of Historic Places.

The "area of potential effect" used for this analysis is the entire Schoodic District, including the former navy base property.

For this analysis, impacts are described in terms of type (beneficial or adverse), context, and intensity. The definitions of levels of intensity vary by impact topic and resource. Generalized definitions related to intensity of impacts to historic properties are presented below.

- **Negligible:** Impact barely perceptible and not measurable; confined to small areas or a single contributing element of the historic properties or archeological sites with low data potential.
- **Minor:** Impact to the resource is perceptible and measurable, but is localized and confined to a single contributing element of the historic properties or archeological sites with low to moderate data potential.
- **Moderate:** Impact is clearly detectable and sufficient to cause a change in character-defining features of the historic resources or archeological sites that could have appreciable effects on the resource.
- **Major:** Impact would have a substantial, highly noticeable influence on the defining features of the historic resources or archeological sites. It would create adverse impacts to the resource and could lead to an impairment of a park resource.
- **Impairment:** Impairment is defined as impacts that:
  - have a major adverse effect on park resources and values,
  - contribute to deterioration of the park’s resources to the extent that its purpose could not be fulfilled as established in its enabling legislation,
  - affect resources key to the park’s natural or cultural integrity or opportunities for enjoyment, or
  - affect the resource whose conservation is identified as a goal in the park’s *General Management Plan* or other park planning documents.

## **VISITOR EXPERIENCE**

The primary source of data for this section is the *Schoodic Peninsula, Acadia National Park, Visitor Study 2000–2001* (Manning et al. 2002). This survey included responses from navy personnel, as well as visitors to the Schoodic District. The study gathered information about the sites visitors are most inclined to seek, the number of visitors throughout the day at key locations, the number of cars on roads in the study area throughout the day, information about the quality of the visitor experience, and on those features of the study area visitors most enjoyed. The standard definitions of thresholds were used to assess impacts.

## **SOCIOECONOMIC ENVIRONMENT**

The research on socioeconomic impacts was completed by obtaining data from federal, state, and county agencies, and economic studies. In 2000, the University of Maine completed an assessment of the impacts of the navy base closure on the economy of Hancock County, Maine (Gabe and Allen 2000). The economic impacts of Acadia National Park were determined by using the Money Generation Model Version 2 (MGM2) developed by Daniel Stynes and Dennis Propst at Michigan State University based on a NPS economic model that estimates the economic benefits of national parks for regional economies (Stynes et al. 2000). MGM2 estimates the impacts that park visitors have on the local economy in terms of their contribution to sales, income, and jobs in the area. Stynes et al. expanded the original model to include the economic effects of NPS salaries, park construction projects, and other park-related activities; and expenditures by other outside parties, such as state spending for park access roads and dollars spent by outside interests for marinas, motels, restaurants, and other park-related capital development projects. The economic model produces quantifiable measures of park economic benefits that can be used for planning, concessions management, budget justifications, policy analysis, and marketing.

The standard definitions of thresholds were used to assess impacts.

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## **LAWS, REGULATIONS, AND POLICIES**

This section describes overarching laws and policies guiding NPS and the management of specific resources.

### **OVERARCHING LAWS**

#### **National Environmental Policy Act (NEPA)**

NEPA is the law that requires all federal agencies to examine possible environmental impacts and alternatives to any proposal they may be considering. It is a mandatory environmental planning process if the proposal may have impacts on physical or natural resources, and includes opportunities for public involvement and comment. NEPA is implemented through regulations of the Council on Environmental Quality (CEQ) (40 CFR 1500-8). The NPS has adopted procedures to comply with NEPA and the CEQ regulations, as found in Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision Making (NPS 2000) and its accompanying handbook. This policy guidance implements the applicable federal laws and provides specific requirements for completing environmental impact statements.

NEPA requires that agencies analyze impacts to resources that might experience effects, reasonable alternatives, and cumulative impacts. Cumulative impacts are those impacts on a resource that would occur independent of the action NPS is considering. The analysis of cumulative impacts helps the reader and decision maker understand something about the "total" or "combined" impacts on a resource that may be also affected by the actions in one of the alternatives. The analysis includes actions taken in the past, present, or in the reasonably foreseeable future, and is without regard to land ownership. Therefore, actions on private or adjacent state land that contribute to impacts on resources in the study area can be included.

#### **Organic Act of 1916**

The founding legislation of NPS, the Organic Act of 1916, prohibits the impairment of park resources and values. *NPS Management Policies 2001* (NPS 2001a) state "impairment...is an impact that, in the professional judgment of the

responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values."

This Environmental Impact Statement (EIS) includes an assessment of whether impairment of park resources or values might be affected as may be identified in the NPS Management Policies 2001. The policies provide guidance on whether an activity with major impacts to resources is also likely to impair those resources. An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, is the key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or is identified as a goal in Acadia's *General Management Plan* or other relevant NPS planning documents. An impact would be less likely to constitute an impairment to the extent that it is an unavoidable result, which cannot be reasonably further mitigated, of an action necessary to preserve or restore the integrity of park resources or values.

These policies have been integrated into this EIS by analyzing whether impacts to each affected resource might be an impairment. The definition of an impairment is: the impact is so sustained and severe that the integrity of the resource will be lost park-wide, and the resource is either important to park purposes or is one whose protection has been spelled out as a reason for creating the park.

### **NATURAL RESOURCES**

#### **Air Quality**

A 1977 amendment to the Clean Air Act designated all national parks over 6,000 acres as mandatory Class I areas, worthy of the greatest degree of air quality protection under the Act. Congress declared as a national goal "the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I federal areas...." NPS managers are expected to know the condition of their air quality and err on the side of resource protection. The NPS is invited to comment on any



state air quality permit applications for new stationary sources expected to emit over 100 tons per year of a single pollutant.

In addition, the Environmental Protection Agency has set air quality standards for six principal "criteria" pollutants, including carbon monoxide, ozone, and two types of particulates (those smaller than 10 microns and those smaller than 2.5 microns). It also regulates the precursors of acid rain (sulfates and nitrates), and mercury from some sources (municipal waste combustors, medical waste incinerators), and monitors mercury emissions from others (notably coal-fired power plants).

*NPS Management Policies 2001* (NPS 2001a) require parks to perpetuate the best possible air quality in park units to preserve natural and cultural resources and to sustain visitor enjoyment, including scenic vistas. Any source of air pollution is required to comply with federal, state, and local air quality regulations and permitting requirements. Indoor air quality in NPS units is also required to be healthful.

#### **Water Resources**

The Environmental Protection Agency has developed national recommended ambient water quality criteria for approximately 120 priority pollutants for the protection of both aquatic life and human health (Environmental Protection Agency 1999a). These criteria have been adopted as enforceable standards by most states. *NPS Management Policies 2001* state that NPS will "take all necessary actions to maintain or restore the quality of surface waters and ground waters within the parks consistent with the Clean Water Act and all other applicable federal, state, and local laws and regulations."

Simply stated, a water quality standard defines the water quality goals of a waterbody by designating uses to be made of the water, by setting minimum criteria to protect the uses, and by preventing degradation of water quality through review and selective permitting of discharges into surface waters. In the study area, the U.S. Navy had a permit for discharge of a certain volume of treated wastewater into Arey Cove, for example.

#### **Soils**

No federal laws specifically regulate soil erosion or loss in parks. However, the Clean Water Act and Maine Natural Resource Protection Act are both considered core laws of the Maine Coastal Program and reinforce provisions of the Coastal Zone Management Act of 1972. These laws regulate such activities as soil disturbance that could result in sedimentation of wetlands or other water bodies. In addition, *NPS Management Policies 2001* require NPS managers to "...prevent, to the extent possible the unnatural erosion, physical removal, or contamination of the soil..." NPS managers are required to prevent or minimize adverse impacts on soils to the extent they are able to do so. Parks are required to obtain surveys of soils adequate for the management of park resources.

#### **Vegetation**

Biological resource management in NPS has its roots in its founding legislation, the Organic Act of 1916, which directs parks to "conserve the scenery and the natural and historic objects and the wild life therein to leave them unimpaired for the enjoyment of future generations." These general powers were broadened (by the Redwood National Park Act, 1988) in which Congress gave further direction that parks should not be managed in any way that might reduce values or purposes for which they have been established. In accord with these laws, *NPS Management Policies 2001* state that the parks will maintain as parts of the natural ecosystems of parks all native plants and animals.

The Endangered Species Act states that plant species are of aesthetic, ecological, educational, historical, recreational, and scientific value to the nation. The Act's purpose is to conserve the ecosystems upon which species depend, and generally, to increase populations and secure sufficient habitat to recover species to viable levels. The act requires NPS to determine whether an action would adversely affect federally listed threatened or endangered plant species. Consultation with the U.S. Fish and Wildlife Service is required if this is the case, to ensure the action will not jeopardize the species' continued existence or result in the

destruction or adverse modification of critical habitat. The act also prohibits activities that would constitute an unauthorized "taking" of the protected species.

The NPS is required to control access to critical habitat for listed species, and perpetuate the natural distribution and abundance of these species and the ecosystems upon which they depend. *NPS Management Policies 2001* also require consideration of all state and locally listed species in planning activities.

Wetlands are protected by Section 404 of the Clean Water Act, which requires permission from the U.S. Army Corps of Engineers to fill more than an incidental acreage of wetland. National Park Service Director's Order 77-1 establishes policies, requirements, and standards for implementing Executive Order 11990, which directs federal agencies to avoid adverse impacts to wetlands. The National Park Service specifically avoids impacts to wetlands wherever possible, but prepares a "statement of findings" including plans to compensate for impacts that could not be avoided if actions will affect wetlands.

#### **Coastal Resources**

The Coastal Zone Management Act requires federal agencies to prepare a consistency determination for every activity in or outside of the coastal zone that affects land or water use of the coastal zone. *NPS Management Policies 2001* allow natural shoreline processes to continue without interference in parks, and investigate alternatives for mitigating the effects of human alterations of natural coastal processes and restoring natural conditions. Beyond this specific guidance, the laws, regulations, and policies cited in this section under "Vegetation" and "Wildlife" would also apply to coastal biological resources.

#### **Wildlife**

The Organic Act of 1916, as noted above, directs parks to "conserve the scenery and the natural and historic objects and the wild life therein to leave them unimpaired for the enjoyment of future generations." *NPS Management Policies 2001* state that the parks will maintain as parts of the natural ecosystems of parks all native plants and animals.

The Endangered Species Act states that fish and wildlife species are of aesthetic, ecological, educational, historical, recreational, and scientific value to the nation. The Act's purpose is to conserve the ecosystems upon which species depend, and generally, to increase populations, and secure sufficient habitat to recover species to viable levels. The act requires NPS to determine whether an action would adversely affect federally listed threatened or endangered animal species. Consultation with the U.S. Fish and Wildlife Service is required if this is the case, to ensure the action will not jeopardize the continued existence of the species or result in the destruction or adverse modification of critical habitat. The act also prohibits activities that would constitute an unauthorized "taking" of the protected species.

The NPS is required to control access to critical habitat for listed species and perpetuate the natural distribution and abundance of these species and the ecosystems upon which they depend. *NPS Management Policies 2001* also require consideration of all state and locally listed species in planning activities.

### **CULTURAL RESOURCES**

All federal undertakings are subject to a variety of regulations designed to protect the environment, including cultural resources. Compliance with the following laws provides the foundation for protecting cultural resources in the United States:

- The National Historic Preservation Act of 1966, as amended (16USC 470 et seq.)
- The Native American Graves Protection and Repatriation Act of 1990 (25USC 3001 et seq.)
- The American Indian Religious Freedom Act of 1978 (42USC 1996 and 1996a)
- The Archeological Resources Protection Act of 1979 (16 USC 470)
- Executive Order 11593 (36 C.F.R. 8921)

The National Historic Preservation Act (NHPA) is the principal legislative authority for management of cultural resources associated with NPS projects. Section 106 of the NHPA requires all federal agencies to consider the effects of their actions on cultural resources determined eligible for inclusion in the National Register of Historic Places. In addition, the NHPA requires that federal agencies take actions to minimize harm to historic properties that would be adversely affected by a federal undertaking. Section 110 of the NHPA, among other things, charges federal agencies with the responsibility for establishing preservation programs for identification, evaluation, and nomination of historic properties to the National Register of Historic Places.

The NPS is charged with protection and management of cultural resources in its custody, as provided in federal laws, regulations, and policies. The NPS is mandated to avoid or mitigate to the greatest degree practicable adverse impacts to park resources and values. Although NPS has the discretion to allow certain impacts within parks, it is limited by the statutory requirement that park resources and values remain unimpaired, unless specified otherwise by law.

### **VISITOR EXPERIENCE**

The 1916 Organic Act requires NPS to ensure its natural and cultural resources are not impaired, but it also requires parks "to provide for the enjoyment of" these resources. *NPS Management Policies 2001* state that the enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks and that NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks. Because many forms of recreation can take place outside a national park setting, NPS will therefore seek to provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the superlative natural and cultural resources found in a particular unit, and defer to other agencies, private industry, and non-governmental organizations to meet the broader spectrum of recreational needs and demands that are not dependent on a national park setting.

Also, unless mandated by law, NPS will not allow visitors to conduct activities that:

- would create an unsafe or unhealthful environment for other visitors or employees,
- are contrary to the purposes for which the park was established, or
- would unreasonably interfere with the atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations within the park; NPS interpretive, visitor service, administrative, or other activities; NPS concessioner or contractor operations or services; or other existing, appropriate park uses.

### **SOCIOECONOMIC ENVIRONMENT**

The handbook accompanying Director's Order 12, *Conservation Planning, Environmental Impact Analysis and Decision Making* (NPS 2000), directs NPS to examine impacts to the socioeconomic environment in environmental assessments and environmental impact statements. The only policy guidance outside of this source for socioeconomics is supplied by Executive Order 12898 (1994) requiring all federal agencies to analyze and consider impacts of actions on minority and low-income populations and communities to make sure they are not adversely and disproportionately affected.

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## IMPACTS TO NATURAL RESOURCES

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### **AIR QUALITY**

#### **Impacts Common to All Alternatives**

**Analysis** - All alternatives call for the consideration of public transportation, such as buses or shuttles. Adding buses during the summer months would remove between 20 and 40 vehicles per day, but would add seven bus trips (assuming U.S. Department of Transportation 2002 figures) along the Schoodic Loop Road. The difference in emissions is 0.03 fewer tons of hydrocarbons, 0.32 fewer tons of carbon monoxide, and 0.037 more tons of nitrogen oxides. This represents a 1.2% decrease for hydrocarbons, 1.5% decrease for carbon monoxide, and a 2.2% increase in NO<sub>x</sub> from vehicles, a minor benefit to local air quality.

If vehicles were parked outside the limits of the park, or just inside at Frazer Point or another park-and-ride location, emissions inside the park would be reduced. Assuming two passengers per car, and that half the bicyclists park and ride, annual emissions from vehicles could be reduced 6–8%, a minor benefit to local air quality.

All alternatives include the possible use of limiting or otherwise managing the number of available parking spaces to a maximum of 350 to reduce the use of personal vehicles. If such measures included very clear signs from Moore Road or State Route 186 to indicate parking was full, such a scheme might be effective in reducing emissions inside the park and encouraging bus or bike ridership. However, without clear information for those entering the park far enough in advance that alternative transportation is available, limiting parking may actually result in increased emissions as cars idle waiting for parking, or complete another loop of the peninsula seeking alternative parking locations.

#### **Impacts of Alternative A: No Action**

**Analysis** - The primary impact to air quality on the Schoodic Peninsula from the No Action Alternative would be from mobile sources. A

recently prepared study of alternate transportation for the Schoodic Peninsula (U.S. Department of Transportation 2002) indicated that on average, about 800 cars traveled the 1-mile Moore Road leading from State Route 186 into the park, continued on around the 6-mile Schoodic Loop Road, and returned to State Route 186 via the 1.9-mile Wonsqueak Road out of the park each day during 2001. These data shows that between 500 and 800 vehicles travel the Schoodic Loop Road. Of this, about 350 were vehicles driven by navy personnel to and from the base. The average number of recreational trips to the park varies seasonally, with about 150 trips per day during all but the summer months, and three times this number during July, August, and September. As of 2000, this translates to 208,000 vehicle trips along the park road at Schoodic per year. Given the assumptions outlined in "Methodology," this translates to 4.1 tons of hydrocarbons, 36.5 tons of carbon monoxide, and 2.8 tons of nitrogen oxides to the air inside the park. Additional pollutants would be emitted from vehicles using Moore Road to reach the park and exiting the park on Wonsqueak Road.

The No Action Alternative would result in fewer car trips driven along the Schoodic Loop Road than current conditions, as navy personnel would no longer commute. A small number of programs might take place at the base, primarily for school or community groups. Some staff would commute, and some lodging (both camping and motel-like rooms) would be available. Recreational use would increase very slowly, concomitant with the rest of the park, at slightly over 1% per year. Given these assumptions, the projected annual number of vehicle trips in the park would be about 155,000 by 2015. Assuming continuing reductions in the average vehicle emission rates (associated with improved technology nation-wide), these cars would add 2.43 tons of hydrocarbons, 21.7 tons of carbon monoxide, and 1.67 tons of nitrogen oxides per year to the park air basin. This is a reduction in emissions of about 40% over 2000 conditions, and a possible major benefit to local air quality.

Stationary sources of emissions similar to those from vehicles include boilers and diesel generators. These emissions would decrease under the No Action Alternative, both from 1998, when the

base was nearly fully occupied and from 2001, the year before it was turned over to NPS, as most buildings at the base would be placed in layup status. Only a few staff and program participants (1,800 per year) would actively occupy any of the base buildings; therefore heating requirements would be significantly lower. SO<sub>x</sub>, nitrogen oxides, carbon monoxide, and particulates associated with operation of the boilers would similarly decrease. The extent of this decrease is unknown; however, it is likely to be on the order of 90% less than even 2001 conditions, as only about 25 people would occupy the base buildings at any given time. Other stationary sources of air emissions include painting and vehicle maintenance activities, such as dispensing gasoline and the use of solvents and degreasers. With so few buildings actively used and so few staff on the base under the No Action Alternative, these emissions would also drop. The combined emissions from stationary sources at both Schoodic and Corea in some cases approach or exceed emissions from vehicles on Schoodic park property. A 90% decrease could approach a major localized (base-specific), and negligible or minor region-wide (southern end of the peninsula, for example) benefit in air quality.

As for indoor air quality, radon tests indicate mitigation systems installed in buildings 84, 184–186, and 191 have been successful (NSGA 2000). Some of these buildings may be used for staff or program housing in the No Action Alternative. Asbestos was removed from buildings 39, 138, and 148 prior to turning the base over to NPS. Twenty-two additional buildings which have less than 1% asbestos in them were not remediated by the U.S. Navy. Of these, 13 would be used by the park under the No Action Alternative. A negligible risk to human health may exist in occupying some of these buildings, particularly if asbestos is contained in the venting systems. However, the risk base-wide of occupying buildings is lower than when the U.S. Navy occupied the base because of mitigation systems.

**Cumulative Impacts** - Cumulative, or additive impacts indicate the extent of damage that is already ongoing at the site and information about past, present, and future trends. Impacts of the alternatives in this EIS are overlain on those from outside sources to give an idea of the

total impact a given resource is experiencing now or expected to experience in the future.

The Environmental Protection Agency has standards in place for several pollutants that will be emitted by vehicles and stationary sources at Schoodic. These include carbon monoxide, nitrogen oxides, sulfur dioxide (precursor to sulfates), and ozone.

Carbon monoxide is a gas that can be poisonous at high concentrations, and that is formed when fuels are not burned completely. It is produced primarily by vehicles. Nationally, carbon monoxide concentrations have declined over the last 20 years; in the region where the park is located (which includes all of Maine), concentrations have decreased by 81% since 1980. However, carbon monoxide concentrations in the East and in most urban areas of the county are still high. In Hancock County, they averaged between 28 and 55 tons/year/square mile in 1999. This is higher than other parts of Maine, but lower than the entire rest of the Atlantic Seaboard to the south (Environmental Protection Agency 1999). The Clean Air Act amendments of 1990 required oxygenation of gasoline to help fuels burn more completely; these and other changes are expected to help the United States continue its trend toward improvements in carbon monoxide concentrations.

Nitrogen dioxide is a reddish brown gas emitted from high-temperature combustion processes, such as in-vehicle engines and power plants. It and other forms of nitrogen oxides are called NO<sub>x</sub>. These compounds are associated with respiratory problems, and are instrumental in the formation of ozone, or smog. Few monitoring sites for nitrogen oxides have operated continuously for 20 years, so data are sketchy. However, two 10-year databases indicate that annual mean concentrations declined in the early 1980s, stabilized for the remainder of the decade, and continued to decline in the 1990s. Concentrations in Maine have decreased by an average of 34% since 1980. This is the second largest decrease in the country over this time period. Concentrations remain moderately high, at 3.36–6.24 tons/year/square mile, in Hancock County. This is higher than much of northern and northwestern Maine, which averages 0–1.72 tons/year/square mile, but lower

than the majority of New England, which averages 14.6 to over 2,000 tons/year/square mile. Although NO<sub>x</sub> concentrations have steadily decreased in the late 1990s, emissions have increased, primarily from heavy-duty diesel engines. Without the implementation of new emission standards for trucks, buses, and other large vehicles, NO<sub>x</sub> concentrations would likely begin to increase.

Ozone concentrations in the park and in Maine generally are highly influenced by pollutants emitted from industrial and mobile sources in the midwestern United States. Ground-level ozone is formed in the atmosphere by the reaction of volatile organic hydrocarbons and nitrogen oxides in the presence of heat and sunlight. It is the prime ingredient of smog, and prolonged exposure has been linked to a number of respiratory problems in people. Measurements have indicated an improvement in average daily maximum ozone concentrations at the park of 11 ppb/year, although enough variability exists that this trend is not statistically significant (NPS 2001). In addition, although the park has experienced improvement, its maximum daily 1 hour average ozone concentrations have exceeded the primary Environmental Protection Agency standard of 120 ppb 10 out of the 16 years from 1983 to 1998. Violations of the Environmental Protection Agency 8-hour standard decreased in Acadia National Park over the past 15 years, from an average of 6.0 during the years 1983-1992 to 2.7 during 1993-1998 (NPS 1999b).

Generally, Acadia National Park does not experience long-term exposure to ozone in high enough concentrations to obviously affect vegetation. The NPS has monitored foliar injury in a limited number of areas where the sum of hourly average ozone concentrations greater than or equal to 60 ppb (SUM60) during the growing season lies between 8 and 15 ppm-hours. Damage to foliage and growth loss, particularly in sensitive species, has been observed at these levels. However, SUM60 at the park ranges from 20 to 40 ppb-hours, and appears to be decreasing (NPS 1999b). Research has been completed to determine whether sensitive species might be experiencing impacts even at these levels.

Decreases in the number of vehicles in the park at Schoodic and the use of boilers or generators at the base that would occur under the No Action Alternative would contribute to decreases in ozone, but the effect would be so small as to be negligible. Creating bike lanes and encouraging the use of bikes instead of cars would add to the positive effect, but the use of buses would not, since diesel buses would contribute more nitrogen oxides than the cars they replace unless alternative fuel buses are used.

Standard visibility range at Acadia National Park varies from about 60 to 90 miles on good days (i.e., the 10% of days when visibility is at its best), and from 15 to 25 miles on poor visibility days (i.e., the 10% of days when visibility is at its worst), and averages 35 to 55 miles (NPS 1999b). The average visual range in 1999 for eastern parks was 14 miles on poor-visibility days (bottom 20%) and 50 miles on the clearest days (top 20%) (Environmental Protection Agency 1999). Although these figures are not exactly comparable, the visibility at the park tends on average to be better than for other eastern parks.

As with other eastern parks and wilderness areas monitored under the Interagency Monitoring of Protected Visual Environments (IMPROVE) program, Acadia National Park suffers from higher regional concentrations of precursors to sulfates and other man-made emissions, higher estimated regional background levels of fine particles, and higher average relative humidity than western parks. Sulfates, which account for the majority of light-extinction effects in the park, are particularly vulnerable to humidity, as they accumulate water and grow in size, becoming more efficient at scattering light (Environmental Protection Agency 1999). Because of these differences, degradation of visibility in eastern parks is more severe. For the period of 1990-1999, visibility on the clearest 20% of days in eastern parks was comparable to the haziest 20% of days in the west.

Visibility is generally best in the fall and worst during the summer months, which is also when

the majority of visitors are in the park. However, average summer visibility has improved slightly in the eastern United States from 1980 to 1995. Data from the late 1990s indicate this trend continued, as visibility on the typical and on the haziest 20% of days both showed a 10% improvement across all 10 eastern parks and wilderness areas measured in 1998–1999 (Environmental Protection Agency 1999). This improvement is due in large part to the decrease in sulfates. In 1999, eastern aerosol light extinction due to sulfates on the haziest days reached its lowest level of the 1990s, with a 19% decline from 1992 to 1999.

Visibility data at Acadia National Park collected for 1990–1999 indicate standard visual range in the park is also improving, particularly on clear days. Median visual range averaged between 35 and 45 miles in the early 1990s at the park, and improved to between 50 and 55 miles by the late 1990s, a 40% increase. Visual range on the clearest (10%) days averaged 65 to 70 miles in the early 1990s, and improved to between 80 and 90 miles in the late 1990s, a 25% increase. Standard visual range on the haziest (10%) days averaged between 18 and 20 miles in the early 1990s, and improved to 23–24 miles by the late 1990s, a 25% increase (NPS 2001).

Decreases in emissions associated with vehicle use at Schoodic and boilers on the navy base associated with the No Action Alternative would have a negligible, positive impact on visibility by reducing precursors to sulfates associated with boilers and hydrocarbons associated with both vehicles and stationary sources.

Decreases in sulfates may also have contributed to a reduction in the threat of acid precipitation in the park. In the years from 1982 to 1997, sulfates have decreased from an average of 22–23 kg/ha to 15–16 kg/ha. Nitrate deposition in rain and snow has remained approximately the same (NPS 1999b). Despite the reduction in sulfate deposition, the pH of rain and snow at the park has remained very nearly the same from 1981 to 1997, at about 4.5. While most park lakes and streams are non-acidic, they are also susceptible to acidification because they are largely unable to neutralize or buffer acidic inputs. These low-alkalinity lakes and streams are typical of the region, and are a function of

the bedrock and other factors outside park control. Alkalinity, or buffering capacity, is decreasing in park lakes as a result of acid deposition, and continues to decrease despite reductions in sulfate deposition. Additional research is ongoing at the park to better understand acidification in the park and its relationship to watershed processes, topography, and other features.

Decreases in emissions associated with vehicle use at Schoodic and boilers or generators on the navy base associated with the No Action Alternative would have a negligible positive impact on acid precipitation locally by reducing precursors to sulfates and nitrates.

**Conclusions** - Because this alternative would result in relatively little use of the base, air quality emissions associated with commuter traffic and on-base heating would be reduced compared to year 2001 conditions. The reduction in ambient concentrations of air pollution could be a moderate to negligible localized benefit, but would be negligible regionally. The use of bikes or buses could result in further negligible to minor benefits. These reductions would also have negligible relative cumulative effects on regional air quality problems attributable largely to sources outside the park, such as visibility, criteria pollutants, and acid precipitation. No actions anticipated in any of the alternatives would affect mercury concentrations. Therefore, since there would be no additive impact, no discussion of mercury concentrations will be included in this *EIS*. No impairment to park air quality would result from implementing the No Action Alternative.

### **Impacts of Alternative B: National Park Service Management**

**Analysis** - As with No Action, the primary impact to air quality on the Schoodic Peninsula from Alternative B would be from mobile sources. However, the impacts relative to conditions during the time the base was occupied by the U.S. Navy, even in 2001 when many functions and staff had already been closed out, would be beneficial for air quality.

Alternative B would result in about 30 staff working at what is now the base and about 13,500 annual program participants (Table 1, page 11). Most of the vehicle trips associated with program participants would take place during July–September. Although they would not be evenly dispersed, about 161,000 vehicle trips are considered a likely annual total for the Schoodic District by year 2015. These trips would add about 2.54 tons of hydrocarbons, 22.6 tons of carbon monoxide, and 1.73 tons of nitrogen oxides each year, or 38% fewer emissions than the 2001 base year, and between 3.6 and 4.5% greater than No Action. This is a major local benefit to air quality compared to the 2001 base year, and a minor localized, adverse impact compared to No Action.

About 30 staff and 13,500 program participants would occupy buildings at the base. Five smaller buildings are slated for removal and 15 additional buildings would either be used or removed. If all are either unoccupied or removed, this could result in about a 50% decrease in the need for heating from boilers. Even greater decreases are likely because fewer buildings would be occupied during the colder months of the year. A 50% decrease could approach a major localized (base-specific), and negligible or minor region-wide (southern end of the peninsula, for example) benefit in air quality.

Radon tests indicate mitigation systems installed in buildings 84, 184–186, and 191 have been successful. All of these buildings could be used for staff or program housing in this alternative. Asbestos was removed from buildings 39, 138, and 148 prior to turning the base over to NPS. Twenty-two additional buildings which have less than 1% asbestos in them were not remediated by the U.S. Navy. A negligible risk to human health may exist in occupying some of these buildings, particularly if asbestos is contained in the venting systems. This risk is slightly greater in Alternative B than No Action, because more buildings would be occupied.

**Cumulative Impacts** - A decrease in traffic and the use of boilers at Schoodic would contribute negligible beneficial impacts to those already ongoing and expected to continue with regards to visibility, ozone, acid precipitation, and

mercury concentrations in the atmosphere in the region. The extent of the reductions would be similar, but not quite as great, as under the No Action Alternative (please see No Action above for more information). The benefits would be too small to measure regionally.

**Conclusions** - Because this alternative would result in fewer vehicles and a less-intensive use of the base than under year 2001 conditions, air quality emissions associated with commuter traffic and on-base heating would be reduced. The reduction could be a major localized benefit compared to 2001 conditions, but would be negligible regionally. The use of bikes or buses could result in further negligible to minor benefits. These reductions would also contribute beneficially to regional air quality problems attributable largely to sources outside the park, such as visibility, ozone, and acid precipitation, although the degree would be too small to detect. Alternative B would result in minor increases in emissions compared to the No Action Alternative. No impairment to park air quality would result from implementing Alternative B.

#### **Impacts of Alternative C: Collaborative Management (Preferred)**

**Analysis** - As with the other alternatives, the primary impact to air quality on the Schoodic Peninsula from the preferred alternative would be from mobile sources. However, as with No Action, the impacts relative to conditions during the time the base was occupied by the U.S. Navy, even in 2001 when many functions and staff had already been closed out, would be relatively beneficial for air quality.

Alternative C would result in about 60 NPS and other staff working at what is now the base and about 31,500 annual program participants (see Table 1, page 11). As with other alternatives, most of the vehicle trips associated with program participants would take place during July–September. Although they would not be evenly dispersed throughout the year, it is estimated that about 170,000 vehicle trips would take place on the Schoodic Loop Road each year by 2015. These trips would add about 2.68 tons of hydrocarbons, 23.9 tons of carbon



monoxide, and 1.83 tons of nitrogen oxides each year, or 36% fewer emissions than the 2001 base year, and between 8.7 and 10.3% greater than No Action. This is a major local benefit to air quality compared to the 2001 base year, and a minor to moderate localized, adverse impact compared to No Action.

As for stationary sources, with 60 staff and 31,500 program participants there would be about a 30% decrease in the need for heating from boilers. Even greater decreases are likely because fewer buildings would be occupied during the colder months of the year. A 30% decrease could approach a major localized (base-specific), and negligible or minor region-wide (southern end of the peninsula) benefit in air quality.

As for indoor air quality, radon tests indicate mitigation systems installed in buildings 84, 184-186, and 191 have been successful. All of these buildings would be used for staff or program housing in this alternative. Asbestos has been removed from buildings 39, 138, and 148 prior to turning the base over to NPS. While building 138 may be removed, the buildings 39 and 148 would be used for classrooms, labs, office, or similar uses. Twenty-two additional buildings which have less than 1% asbestos in them were not remediated by the U.S. Navy. All of those in this group used in No Action would also be used by NPS in the preferred alternative. In addition, buildings 3, 39, 105, 148, and 184-191 would definitely be occupied. Others of this group, including buildings 138 and 165, may be used as well. A negligible risk to human health may exist in occupying some of these buildings, particularly if asbestos is contained in the venting systems. This risk is slightly greater in Alternative C than No Action or Alternative B, because more buildings would be occupied.

**Cumulative Impacts** - A decrease in traffic and the use of boilers at Schoodic would contribute negligible beneficial impacts to those already ongoing and expected to continue with regards to visibility, ozone, acid precipitation, and mercury concentrations in the atmosphere in the region. The extent of the reductions would be similar, but not quite as great, as under the No Action Alternative (please see No Action above

for more information) or Alternative B. The benefits would be too small to measure regionally.

**Conclusions** - Because this alternative would result in fewer vehicles and a less intensive use of the base than during the base year of 2001, air quality emissions associated with commuter traffic and on-base heating would be reduced. The reduction could be a major localized benefit compared to 2001 conditions, but would be negligible regionally. The use of bikes or buses could result in further negligible to minor benefits. These reductions would also contribute beneficially to regional air quality problems attributable largely to sources outside the park, such as visibility, ozone and acid precipitation, although the degree would be too small to detect. Alternative C would result in minor to moderate increases in emissions compared to the No Action alternative. No impairment to park air quality would result from implementing Alternative C.

## **WATER RESOURCES**

### **Impacts Common to All Alternatives.**

The degree of impact to water resources would change with each alternative. There are no impacts shared by all alternatives.

### **Impacts of Alternative A: No Action**

**Analysis** - The well, water treatment facility, and wastewater treatment capacity at the base are all designed to accommodate between 100 and 500 people (NSGA 2000). In 1997, the base employed about 500 military and civilian personnel. By 2001, this had declined to about 350 people. About 30,000 gallon per day (gpd) of treated wastewater and 25,000 gallons per day of sludge were discharged on average during 2001.

Implementing the No Action alternative would result in 5-25 people on the base at any one time (5 during the winter months, 25 during the summer). This is a 93-98% reduction in the use of the water-related facilities. Although it may make economic sense to continue to treat water

in batches using existing technology and facilities, it may be cheaper and more efficient to close the wastewater treatment facility and install a simple septic system. Regardless of whether NPS continues to operate both the water and wastewater treatment facilities as they are now, or install a simple septic system, the treated effluent, which is now discharged into Arey Cove between the east coast of Big Moose Island and the west shore of Little Moose Island, would be significantly reduced. A concomitant beneficial impact of unknown magnitude to the water quality of Arey Cove would follow. Given that the base discharged between 30,000 and 45,000 gallons per day (as much as 16 million gallons per year) of highly organic material into the cove for several years, the impact could have been a moderate or even major one to the cove's water quality. The benefit of reducing or eliminating the discharge could likewise be moderate or major.

The well supplying the base produces 100 gpm. Under the No Action Alternative, only 5–25 people would occupy the navy base at any given time. This is far less than even under the 2001 scenario for a downsized navy base. Impacts to the groundwater supply as a result would be beneficial, as although this well appears to be very productive, groundwater yields in the region are usually much lower. The extent of this benefit is unknown, but likely only negligible or minor compared to the volume of groundwater in the aquifer.

The Schoodic Peninsula has few streams and no defined hydrologic sub-basins. Frazer Creek drains year-round into Mosquito Harbor at the entrance to the park on Schoodic, but no perennial surface streams exist on Big Moose Island. Seeps, springs, and artesian springs are present on Big Moose Island, and contribute to the wet forests in some parts of the property.

Impacts to Frazer Creek or to the springs on the peninsula are unlikely from visitors or program participants under the No Action Alternative. The extent of such an impact is unknown; however, it is expected to be negligible. This is because the vast majority of visitors to the park engage in sightseeing from their cars, rather than hiking into the forests, particularly if no trails exist (Manning et al. 2002). Despite navy

personnel's use of the trails extending from the base, the impact to water elements in the study area from such activity are negligible. This is expected to continue even if staff or program participants visit sensitive areas since so few programs would take place at Schoodic under the No Action Alternative.

**Cumulative Impacts** - Examples of cumulative impacts on water resources in the study area would be those impacts visitors already exert on Frazer Creek, or outside influences on Arey Cove, the base well supply, or wastewater treatment facilities. No outside influences on these localized water resources are known; some loose soil or grease, oil, or petroleum products from cars crossing into the park or parked at the Frazer Creek parking lot may wash into Frazer Creek during rainstorms or spring snowmelt. These impacts have not been monitored or measured, but are assumed to be negligible.

**Conclusions** - Reductions in the number of people using base infrastructure, such as drinking water and wastewater treatment, resulting from the implementation of the No Action Alternative, is expected to have a negligible to minor beneficial impact to groundwater supplies, and an unknown, but possibly moderate benefit to water quality in Arey Cove. Negligible to minor impacts to springs, seeps, or to Frazer Creek are possible from erosion of soils or petroleum products from vehicles. No impairment to any water resource feature in the study area would likely occur.

#### **Impacts of Alternative B: National Park Service Management**

**Analysis** - Implementing Alternative B would result in 30 staff using the base during the bulk of the year, and as many as 150 additional program participants/day during the summer months. This is nearly 60% fewer people on base, even when the Schoodic Education and Research Center is at full capacity, and a 90% decrease during the winter months. This averages out to about 80–85% less well water or wastewater treatment required than during 2001 under the U.S. Navy's annual operation of the base. Discharge of treated wastewater to Arey Cove will be reduced by the same 80–85%. As

noted above under No Action, the base discharged between 30,000 and 45,000 gallons per day (as much as 16 million gallons per year) of highly organic material into the cove for several years. The impact of such a practice on the water quality in the cove is unknown, but could have been moderate or even major. The benefit of reducing the discharge by 80–85% could likewise be moderate or major. The volume of wastewater discharged to Arey Cove under Alternative B would be on average 15% higher than under the No Action Alternative, an unknown, but possibly moderate adverse impact on water quality in the cove.

Under the No Action Alternative, only 5–25 people would occupy the base at any given time. Implementing Alternative B would increase this to as many as 180 people, a six-fold increase in demand for well water. Compared to No Action, this increase could have an adverse impact on the supply of groundwater. Given that yields have been high even when the base was occupied by 500 people, the extent of this impact is expected to be negligible or minor compared to the apparent volume of groundwater in the aquifer.

Impacts to Frazer Creek or to the springs on the peninsula from visitors or program participants are more likely under this alternative than No Action. The extent of such an impact is unknown, and is dependent in large part upon how accessible these features become to visitors. Water quality could experience some increase in turbidity as a result of visitors hiking in the area or upslope of seeps and springs. If NPS monitors these water features and stops field trips or closes off areas when impacts are noticeable, it will prevent them from becoming more than negligible. If this is not the case, the impact of many hikers or program participants on water quality in these springs could be minor or even moderate compared to the No Action Alternative.

**Cumulative Impacts** - Cumulative impacts would be the same as for the No Action Alternative.

**Conclusions** - Reductions in the number of people using base infrastructure compared to when the U.S. Navy occupied the base would

have benefits for water quality in Arey Cove and for groundwater supplies. However, this alternative would result in adverse impacts to these resources compared to the No Action Alternative. The extent of these impacts is unknown, but could be a moderate impact to Arey Cove water quality and a negligible to minor impact to groundwater resources. Negligible to minor impacts to springs, seeps, or to Frazer Creek are possible from erosion of soils or petroleum products from vehicles. No impairment to any water resource feature in the study area would occur.

### **Impacts of Alternative C: Collaborative Management (Preferred)**

**Analysis** - Implementing Alternative C would result in 60 staff using the base during the bulk of the year, and as many as 350 additional program participants/day during the summer months. This is about 15% more people on the base than during 2001 (but 20% fewer than when the base was at full operation in 1998) during three months of the year, and 80% fewer during the remainder of the year. This averages out to about 55% less well water or wastewater treatment required than during 2001 under the U.S. Navy's annual operation of the base. Discharge of treated wastewater to Arey Cove will be reduced by the same 55%. As noted above under No Action, the base discharged between 30,000 and 45,000 gallons per day (as much as 16 million gallons per year) of highly organic material into the cove for several years. The impact of such a practice on the water quality in the cove is unknown, but could have been moderate or even major. The benefit of reducing the discharge by 55% compared to 2001 conditions could be minor or moderate. The volume of wastewater discharged to Arey Cove under Alternative C would be on average 40% higher than under the No Action Alternative, an unknown, but possibly moderate to major adverse impact on water quality in the cove.

Under the No Action Alternative, only 5–25 people would occupy the base at any given time. Implementing Alternative C would increase this to as many as 410 people, a 15-fold increase in demand for well water. Compared to No Action, this increase could have an adverse impact on the supply of groundwater. Given

that yields have been high even when the base was occupied by 500 people, the extent of this impact is expected to be negligible or minor compared to the volume of groundwater in the aquifer.

Impacts to Frazer Creek or to the springs on the peninsula from visitors or program participants are much more likely under this alternative than No Action. The extent of such an impact is unknown, and is dependent upon the accessibility of these features to program participants and visitors, and the degree of control NPS exerts on its partners. Because water features are popular, water quality could experience some increase in turbidity as a result of visitors hiking in the area or upslope of seeps and springs. If NPS monitors these water features and stops field trips or closes off areas when impacts are noticeable, it will prevent them from becoming more than negligible. If this is not the case, the impact of many hikers or program participants to water quality in these springs could be moderate or even major compared to the No Action Alternative.

**Cumulative Impacts** - Cumulative impacts would be the same as for the No Action Alternative.

**Conclusions** - Reductions in the annual number of people using base infrastructure compared to when the U.S. Navy occupied the base would have benefits for water quality in Arey Cove and for groundwater supplies. However, this alternative would result in adverse impacts to these resources compared to the No Action Alternative. The extent of these impacts is unknown, but could be a moderate or major impact to Arey Cove and negligible to minor impact to groundwater resources. Negligible to minor impacts to springs, seeps, or to Frazer Creek are possible from erosion of soils or petroleum products from vehicles. No impairment to any water resource feature in the study area would occur.

## **SOILS**

### **Impacts Common to All Alternatives**

Human activities, such as hiking, fishing, sight-seeing, etc., can all have an impact on soil. The impacts can be numerous, and include loss of the surface organic layers, compaction, reduction in porosity and infiltration rates, and increases in erosion (Cole and Landres 1995). These types of impacts occur to a greater degree where human use is more evident, such as along trails. While NPS builds and maintains its trails to certain standards, social trails are undesignated paths created by persistent visitor use. Many of these social trails exist on Little Moose Island, and all alternatives include their revegetation. Doing so would stabilize a small amount of soil, perhaps one to two acres, that is now actively eroding, a minor localized benefit. All alternatives also include the creation of an additional 0.75 mile of trail on Little Moose Island, a negligible to minor adverse impact to soils on the island. All alternatives also include controlling visitor use in critical habitats to protect resources. These restrictions may reduce soil erosion, both on and off trails, a positive impact of unknown magnitude.

### **Impacts of Alternative A: No Action**

**Analysis** - Soils would be affected outside of the former navy base property primarily by foot traffic. Since most of the visitor destinations or scenic pull-offs are paved or on rock, they would not be subject to erosion. However, all of the trails between Schoodic Head and the shoreline or from the base to the coast slope downward. In addition, visitors have created social trails on Little Moose Island and on the former navy base in the vicinity of the Sundew Trail, which leads from the base to a rocky intertidal coastline on the west side of Big Moose Island. The slope from Schoodic Head is quite steep, and a recent survey of visitors to the peninsula indicated the majority of hikers find the degree of environmental damage on those trails, including soil loss, to be a minor or moderate problem.

About 20–25% of visitors to the Schoodic District surveyed recently by NPS (NPS 2001,

NPS 2002) indicated that they hiked with more than 80% of those reporting using trails originating on Schoodic Head. This same survey asked the hikers two questions about environmental impact they saw. Using a series of five photos illustrating increasingly severe impacts, such as erosion, widening, and loss of vegetation, they first asked which photo showed the highest level of environmental impact NPS should allow on trails. Nearly half picked photo 2, and another quarter picked photo 3. They also asked which level of impact they typically saw on Schoodic trails during the day they were contacted for the study. Nearly 60% chose photo 2. This means many visitors, and perhaps a majority of them, find impacts to soils and vegetation on Schoodic's trails to already be at the limit of acceptability.

While this alternative could also result in some impacts from program participants to soils at existing park facilities and trails, it is likely to be comparatively less than under 2001 conditions. This is because the number of people on the base will be significantly reduced over 2001 conditions, and impacts associated with their use of trails leading from the base to the coast, or social trails on and off the base, will also be reduced. This alternative would add about 1,800 program participants and staff to the current visitation (Table 1, page 11). This is about 3% more visitors than if the base was not used for educational purposes, with resulting negligible additional impact to soils along trails possible. However, visitor surveys indicate nearly 45% of base personnel used the park facilities (roads, trails, picnic areas, etc.) several times a month to several times a week, and of those 40–50% walked, hiked, or jogged on park trails. Assuming this sample (103 participants) is valid for all base personnel, base closure would remove about 70–75 people from regular use of the trails. Alternative A would add a maximum of 20 program participants per day, and many may not use the trails at all. Assuming existing 20–25% use of trails by visitors, 4–5 program participants on average might use the trails during summer months. This is an 85–90% decrease in use from 2001 conditions, with possible minor benefits to soils along these trails.

This alternative is also likely to result in a comparative decrease in impact to soil on the Sundew Trail, again because the number of people on the base will be significantly reduced over 2001 conditions, and impacts associated with their use of trails leading from the base to the coast, or social trails on the base between buildings, will also be reduced. During the period of time the base was used by the U.S. Navy, 350–500 personnel had access to these trails, and a large portion (probably more than the 45% using park trails) may have used them for exercise or sightseeing (Manning et al.). Alternative A would result in only 20 people per day on the base maximum, and simply from a human use standpoint, a possibly large-scale reduction in the use of these trails. The present condition of the trails would deteriorate more slowly, leading to a minor positive impact relative to the continuation of the U.S. Navy's use of the base.

The reduced use of the base may have similar benefits for other base soils as well, particularly if base personnel used some areas for exercise or moving between buildings, resulting in soil compaction or erosion. The extent of these impacts is unknown, but likely to be negligible.

The No Action Alternative would not result in the removal of any of the buildings on the base or the restoration of vegetation. Therefore, none of the 30 acres already cleared to build the base would be revegetated (i.e., no change would take place from 2001 conditions as it would in other alternatives).

Activities associated with fuel storage or refueling, vehicle maintenance, or the storage or use of hazardous chemicals or hazardous wastes would be significantly reduced or even eliminated under NPS ownership. Therefore, the potential for soil contamination would also be eliminated or reduced. This is a minor or moderate localized benefit of the No Action Alternative compared to the 2001 base year, and a negligible to minor benefit to soils in the study area.

**Cumulative Impacts** - Soils have historically been disturbed or removed to accommodate day use at Schoodic, and to build trails, roads, and buildings, including those at the base. The trails

from Schoodic Head include one that is a part of a road constructed in the 1880s; therefore even early vehicle traffic has contributed to soil loss in the study area. In addition, because most of the drainages in the area are short and steep and soils are thin, natural erosion occurs during rainstorms or snowmelt.

Visitation would continue to increase slowly over the 10–15-year time frame of the plan by about 1% per year. Over 15 years, this could mean an increase in use of trails and park facilities of about 15%, with resulting adverse impacts to soils, particularly on existing trails in the park between Schoodic Head and the coast. Since erosion of trails is already considered a moderate impact by about half the visitors to the peninsula now, an increase in use with no other changes would be likely to worsen this perception. Either more visitors would see the impact as moderate, or some portion would now view it as a major problem for soils and vegetation.

**Conclusions** - Increases in visitation to the peninsula unrelated to the reuse of the base would add impacts to ongoing erosion of some trails in the study area, and increase impacts from moderate to major. These trails have been used historically as roads in some cases, and have been available to hikers for decades, resulting in fairly serious losses of soils from erosion. These losses would be somewhat mitigated by the reductions in use attributable to base closure by the U.S. Navy, but worsened slightly by program participant use. These latter two factors could result in a net minor positive impact on soils at park trails. Relative reductions in the use of trails on the base compared to 2001 conditions could bring minor benefits to soils along these trails as well. A minor to moderate localized benefit to soils from reductions in fuel storage, refueling, and the storage and use of hazardous materials relative to 2001 conditions is also likely. No impairment to soils in the study area would occur.

#### **Impacts of Alternative B: National Park Service Management**

**Analysis** - Implementing Alternative B could result in noticeable additional localized impacts on existing trails or at locations where visitors

are most likely to stop compared to both existing conditions in 2001 and to the No Action Alternative. Trails leading from the base to the shore, and trails between Schoodic Head and the coast, would both be attractive to program participants seeking to learn about the natural resources of the area or to experience the natural quiet and scenery. The impacts of program use on existing trails are not expected to be more than negligible or minor compared to No Action, but may increase the overall degree of localized impact ongoing now from moderate to major. The impact of trail use overall to soils in the study area is negligible.

Programs may include hiking off the trails, which in some cases could result in the erosion of soils, particularly on steep or sparsely vegetated slopes. Impacts to soils from this activity are not expected to be more than negligible, particularly since hikes would be led by park staff who would monitor for resource damage.

The social trails that lead from the base to the shoreline would be consolidated into one or two, and linked to existing trails. Soils on unused trails would then be restored and replanted. The Sundew Trail would be improved to NPS standards, reducing erosion compared to that on the more random series of trails leading from the former navy base. Erosion from trails as a result of this consolidation and adherence to standards could result in minor to moderate reductions compared to the No Action Alternative. Overall, the effects of more intensive use of the existing park trails, and consolidation and restoration of trails leading from the base, may nearly cancel each other out, resulting in negligible increases or decreases in erosion from trails compared to the No Action Alternative.

Alternative B would result in the removal of 10 buildings on the base and the revegetation of about 40 acres of disturbed landscape. This is an approximate 40–50% improvement over No Action, and a major localized benefit to soils on the base. It is a negligible to minor benefit to soils over the entire study area.

As under No Action, activities associated with fuel storage or refueling, vehicle maintenance, or the storage or use of hazardous chemicals or hazardous wastes would be significantly

reduced or even eliminated under NPS ownership. Therefore, the potential for soil contamination would also be eliminated or reduced. This is a minor to moderate localized benefit of this alternative, compared to the 2001 base year, but is the same as the No Action Alternative.

**Cumulative Impacts** - Cumulative impacts under this alternative would be the same as for No Action.

**Conclusions** - Increases in erosion on trails associated with more intensive use would be partially or fully offset by removing some trails, and rehabilitating the remainder. Negligible beneficial or adverse impacts to soil from erosion on trails relative to No Action are possible. Between 40% and 50% of soil removed to build at the base would be restored, a major localized benefit to base soils. Spills of fuels and other contaminants would be reduced from 2001 conditions, a minor to moderate localized benefit to soils at the base, but impacts would be neither beneficial nor adverse compared to No Action.

No impairment to park soils would occur.

#### **Impacts of Alternative C: Collaborative Management (Preferred)**

**Analysis** - Implementing Alternative C is likely to result in larger increases in trail use, as well as hiking through the forests or other vegetation, compared to all other alternatives. Trails leading from the base to the shore, and trails between Schoodic Head and the coast, would be attractive to program participants seeking to learn about the natural resources of the area or to experience the natural quiet and scenery. Erosion on these trails is already considered a problem by many visitors. The impacts of adding program use on existing trails are not expected to be more than minor compared to No Action, but may increase the overall degree of localized impact ongoing now from minor or moderate to moderate or major. The impact of trail use to soils in the study area is negligible or minor.

Hiking off the trails may increase without strict NPS oversight of programming, which could result in the erosion of soils on steep or sparsely

vegetated slopes. Impacts to soils in the area (and not on trails) could range from negligible to minor before park staff are aware that damage is occurring and corrective measures are required.

Adherence to trail standards could result in minor to moderate reductions compared to the No Action Alternative. Overall, the effect of more intensive use of the existing park trails, and consolidation and revegetation of trails leading from the base may nearly cancel each other out, resulting in negligible to minor increases in erosion from trails compared to the No Action Alternative.

Alternative C would result in the removal of 10 buildings on the base and the accompanying revegetation of about 16 acres of disturbed soils. This is an approximate 15–20% improvement over No Action, and a moderate localized benefit to soils on the base. It remains a negligible benefit to soils over the entire study area.

As under No Action, activities associated with fuel storage or refueling, vehicle maintenance, or the storage or use of hazardous chemicals or hazardous wastes would be significantly reduced or even eliminated under National Park Service ownership. Therefore, the potential for soil contamination would also be eliminated or reduced. This is a minor to moderate localized benefit of this alternative compared to the 2001 base year, but has no impacts, positive or negative, compared to No Action.

**Cumulative Impacts** - Cumulative impacts under this alternative would be the same as for No Action.

**Conclusions** - Increases in erosion on trails associated with more intensive use would be partially offset by removing some trails, although minor adverse impacts from erosion related to increased program participant use compared to No Action are likely. Between 15% and 20% of soil removed to build at the base would be restored, a moderate localized benefit to base soils. Spills of fuels and other contaminants would be reduced from 2001 conditions, a minor to moderate localized benefit to soils at the base, but impacts would be neither beneficial nor adverse compared to No Action. No impairment to park soils would occur.

## **VEGETATION**

### **Impacts Common to All Alternatives**

All alternatives include the inventorying and monitoring of natural and cultural resources, and the use of this information along with studies to determine acceptable visitation over time. They also all include possible controls on visitor use in important vegetative communities to protect those resources from the impacts of visitors. These measures may include signs, information packets, the requirement for permits to enter, or the partial or complete closure of areas to visitation. Candidates for the special application of protective measures and the protected natural area subzone include the Jack Pine Woodlands, the western side of Little Moose Island where rare plants grow, and wetlands. These measures could dramatically improve conditions at some of these communities, particularly on Little Moose Island. For others, where conditions are relatively undisturbed, controlling or preventing future human disturbance might result in minor to moderate localized benefits for vegetation.

In addition, regardless of the alternative, NPS will revegetate existing social trails on Little Moose Island, and create a 0.75-mile trail to allow the public access without further degrading the vegetation that exists on the island. Little Moose Island hosts two species of state listed rare plants and a "Rare or Exemplary Natural Community" (i.e., Maritime Shrubland). The fragile vegetation is threatened with loss on some parts of the island from trampling by visitors because there is not a designated trail. Creating a clearly marked trail and blocking off and restoring existing social trails on the island could have a major local beneficial impact to the patches of rare plants and coastal headland vegetative community on Little Moose Island. NPS will survey the trail route to ensure no rare plants would be adversely affected; however, there may be some impacts while making trail improvements. This is a negligible impact to vegetation in the study area.

All alternatives also include the application of general park policies to control invasive plant species and to encourage the growth of native species where it is appropriate or practical. At

this time, none of the 75 species of non-native plants in the study area are considered common or aggressive enough to pose a significant threat to native plants species or plant communities (Mittlehauser et al. 1995). These policies therefore have no impact on vegetation to date. However, NPS monitors for aggressive species, such as purple loosestrife, and monitoring and controlling it may have some small benefit in the future for the freshwater wetlands at Schoodic.

All alternatives include a proposed conservation easement on all or part of the 1,600-acre privately owned tract between the Schoodic District's northern boundary and State Route 186 in Winter Harbor. A conservation easement could prohibit or limit the development of this land. This could be a minor to major benefit to forest vegetation on the peninsula depending on the future use of the property without park protection.

All alternatives also involve the removal of some unused structures in the study area, such as perimeter fencing. Revegetation of these few acres would provide a negligible benefit to vegetation in the study area, but could provide a minor or even moderate benefit to vegetation locally.

### **Impacts of Alternative A: No Action**

**Analysis** - Visitation would continue to increase slowly over the 10–15 year time frame of the plan by about 1% per year. Over 15 years, this could mean an increase in use of trails and park facilities of about 15%, with resulting adverse impacts to vegetation, particularly on existing trails in the park between Schoodic Head and the coast. These impacts would result in part from crushing, shearing, and uprooting vegetation, as well as soil compaction, reduced infiltration rates, and erosion associated with foot traffic. All of these adversely affect the germination, establishment, growth, and reproduction of plants. Since impacts to trails are already considered a minor to moderate impact by about half the visitors to the peninsula now, an increase in use with no other changes would likely worsen this perception. Either more visitors would see the impact as moderate, or some portion would now view it as a major problem for soils and vegetation.



While this alternative could result in some impacts from program participants to vegetation at existing park facilities (including trails leading from Schoodic Head), it is likely to be comparatively less than under 2001 conditions. This is because the number of people on the base will be significantly reduced over 2001 conditions, and impacts associated with their use of trails leading from the base to the coast, or pathways (social trails) on the base between buildings will also be reduced. This alternative would add about 1,800 annual program participants and staff to the existing visitation. This is about 3% more visitors than if the base was not used for educational purposes, with resulting negligible additional impact to vegetation along trails possible. However, visitor surveys indicate nearly 45% of base personnel used the park facilities (roads, trails, picnic areas, etc.) several times a month to several times a week, and of those 40–50% walked, hiked, or jogged on park trails. Assuming this sample (103 participants) is valid for all base personnel, base closure would remove about 70–75 people from regular use of the trails. Alternative A would add a maximum of 20 program participants per day, and many may not use the trails at all. Assuming existing 20–25% use of trails by visitors, 4–5 program participants on average might use the trails during summer months. This is an 85–90% decrease in use from 2001 conditions, with possible moderate benefits to vegetation along these trails.

Perhaps the most important benefit to vegetation will be the reduced use of the 1-mile Sundew Trail and social trails between the base and the coastline. These trails lie on the westerly side of Big Moose Island through coniferous forest and spray zone vegetation on park property. During the period of time the base was used by the U.S. Navy, 350–500 personnel had access to these trails. Although park visitors could also use the Sundew Trail, apparently not many were aware of it and visitor use was relatively rare (NPS staff, personal communication, October 2002). Under Alternative A, visitor use of the former base is expected to be relatively low, and simply from a human use standpoint, this change could result in a reduction in the use of these particular trails compared to 2001 conditions. Although it is unknown whether the trails received extensive use, or

whether reducing use would restore vegetation they provide access to a fragile natural area where human use should be limited. Adopting Alternative A would provide moderate benefits.

The relative reduction in use of the base may have benefits for other vegetation as well, allowing native plants to become reestablished in areas used for exercise and for moving between buildings. However, if these areas are not monitored, non-native weedy vegetation could grow as well. The extent of these impacts is unknown, but likely to be negligible.

Vegetation has been lost as a result of building on the base, and no restoration of habitat is planned for this alternative; i.e., impacts would not change from existing conditions in this regard.

**Cumulative Impacts** - Vegetation has historically been disturbed or removed to accommodate visitor use at Schoodic by building trails, roads, parking lots, and restrooms. The trails from Schoodic Head include one that is a part of a road constructed in the 1880s; therefore, even early vehicle traffic has contributed to loss of vegetation in the study area. Ongoing visitor use of these trails continues to result in some loss of soils and vegetation. According to a recent poll of visitors, nearly half found the loss of soils and vegetation on these trails at least a minor impact. Compared to existing vegetation over the entire study area, these changes and ongoing impacts have had a minor to moderate adverse impact.

**Conclusions** - Identifying acceptable visitation over time and providing information through signs, brochures, and other means to protect sensitive or rare vegetation from visitor use could result in major localized benefits for vegetation compared to existing conditions on Little Moose Island, and minor to moderate benefits in other currently less disturbed vegetative communities. Creating a clearly marked trail and blocking off and revegetating existing social trails on the island could have additional major local, beneficial impacts to the patches of rare plants and coastal headland vegetative community on Little Moose Island. Continuing monitoring for invasive plants and the application of existing park policies to their control may have

some small benefit in the future for the freshwater wetlands at Schoodic. Acquisition of a conservation easement on property to the north of the park could provide a minor to major benefit to peninsula forests by preventing future harvesting of trees. Removal of unused structures, such as perimeter fencing, could provide a minor or even moderate benefit to vegetation locally.

Increases in visitation over the life of the plan will increase impacts to vegetation along some trails from moderate to major for a greater number of hikers. Program participants will add some negligible use to Schoodic Head trails, but reductions related to base closure could result in overall relative moderate benefits to vegetation along these trails compared to 2001 conditions.

No change in the loss of vegetation associated with buildings on the base would occur; however, the reduction in the use of the Sundew and other trails originating on the base could have local benefits of unknown magnitude to vegetation along the trail routes. No impairment to park vegetation would occur if this alternative were selected.

#### **Impacts of Alternative B: National Park Service Management**

**Analysis** - As with No Action, visitation would continue to increase slowly over the 10–15 year time frame of the plan by about 1% per year. Over 15 years, this could mean an increase in use of trails and park facilities of about 15%, with resulting adverse impacts to vegetation, particularly on existing trails in the park between Schoodic Head and the coast. These impacts would result in part from crushing, shearing, and uprooting vegetation, as well as soil compaction, reduced infiltration rates, and erosion associated with foot traffic. All of these adversely affect the germination, establishment, growth, and reproduction of plants. Since impacts to trails are already considered a minor to moderate impact by about half the visitors to the peninsula now, an increase in use with no other changes would likely worsen this perception. Either more visitors would see the impact as minor or moderate, or some portion would now view it as a major problem for soils and vegetation.

As with the No Action Alternative, while Alternative B does add program participants to the base who are likely to use park facilities, including trails to and from Schoodic Head, it may be that fewer of these program participants would use these facilities than did navy personnel. Alternative B would bring about 13,500 annual program participants and staff to the area, or about 150 per day. Assuming 25% of them use park facilities, an average of 35–40 per day would make regular use of the trails and facilities. This is about half of what occurred when the U.S. Navy operated the base. Compared to No Action, this is an 85–90% increase in use, with possible minor to moderate localized impacts to vegetation along trails and at other park facilities. However, trails leading from the base to the shore, and trails between Schoodic Head and the coast, would both be attractive to program participants seeking to learn about the natural resources of the area or to experience the natural quiet and scenery. Many more program participants than the average 25% of visitors to the area may use them, resulting in more severe impacts to vegetation.

As noted in the analysis of Alternative A, trail use will be limited in fragile natural areas to reduce impacts to vegetation.

Assuming restricted use, the application of NPS standards, and the revegetation of social trails, the impact of program use on the Sundew Trail would be offset and no more than negligible. However, since NPS standards are already applied to trails leading from Schoodic Head, directed use and an increase in use by 85–90% or more compared to No Action could result in moderate or even major localized adverse impacts to the trails' vegetation. The impact of trail use to vegetation in the entire study area is negligible.

The addition of programs and program participants to the area could also have adverse impacts on vegetative communities on the peninsula. Because these communities are unusual, they make excellent areas of study for those seeking to learn about the natural history of the peninsula. Targeted use of these special communities, such as jack pine, northern white cedar seepage forest, or freshwater wetlands could result in inadvertent trampling of the understory or of rare plants themselves, as well as soil erosion and resultant loss of vegetation.

The same is true for rare plant species, such as some bryophytes or arctic-maritime species, which occur sporadically on Big Moose Island and in greater abundance on Little Moose Island. Since no trails exist to most of these communities, students may need to hike across vegetated ground to access them, again resulting in inadvertent trampling and destruction of the understory. The extent of such an impact is unknown, and could range from negligible to moderate in intensity. Specific impacts would depend on the frequency of use and vulnerability of the plants to trampling and soils to erosion. In general, plants that are either very small or very large, grow flat or in dense tufts, have tough or flexible leaves, grow rapidly or produce many seeds, or are annuals are more resistant to trampling (Cole and Landres 1995). At low levels of disturbance, some vegetation may actually increase in species diversity as well as the complexity of vertical structure (by creating canopy openings, for example). However, at moderate or higher levels of disturbance, vegetation at moderate height is often stripped, and vulnerable ground cover destroyed. Biomass, species diversity, and complexity of vertical structure are all reduced.

Alternative B would result in the removal of 10 buildings on the base and the revegetation of about 40 acres of disturbed land. This is a 40–50% improvement over No Action, and a major localized benefit to vegetation on the base. It is a minor (1–10%) benefit to vegetation over the entire 2,366-acre study area.

**Cumulative Impacts** - Cumulative impacts would be the same as for No Action.

**Conclusions** - Impacts identified in the "Conclusions" section above under No Action and resulting from activities common to all alternatives would apply to Alternative B as well. These include benefits associated with identifying acceptable visitation over time, revegetating existing social trails on Little Moose Island, application of NPS policies regarding invasive plants, possible acquisition of a conservation easement on property to the north of the park, and the removal of unused structures, such as the perimeter fencing. Increases in visitation over the life of the plan would remain the same, resulting in the same impacts to vegetation along park trails.

Assuming similar use patterns by program participants as other visitors, trails to and from Schoodic Head and elsewhere in the Schoodic District would experience minor to moderate localized impacts compared to No Action. Directed program use could increase impacts to moderate to major. Impacts to the Sundew Trail could be offset to negligible by revegetating social trails, applying trail building and maintenance standards, and limiting use.

The addition of programs and program participants to the area could also have adverse impacts ranging from negligible to locally major on vegetative communities on the peninsula from students hiking through or to them for learning purposes. A major localized benefit to vegetation on the base from removing buildings is likely. No impairment to park vegetation would occur if this alternative were selected.

#### **Impacts of Alternative C: Collaborative Management (Preferred)**

**Analysis** - As with No Action, visitation would continue to increase slowly over the 10–15-year time frame of the plan by about 1% per year. Over 15 years, this could mean an increase in use of trails and park facilities of about 15%, with resulting adverse impacts to vegetation, particularly on existing trails in the park between Schoodic Head and the shoreline. These impacts would result in part from crushing, shearing, and uprooting vegetation, as well as soil compaction, reduced infiltration rates, and erosion associated with foot traffic. All of these adversely affect the germination, establishment, growth, and reproduction of plants. Since impacts to trails are already considered a minor to moderate impact by about half the visitors to the peninsula now, an increase in use with no other changes would likely worsen this perception. Either more visitors would see the impact as minor or moderate, or some portion would now view it as a major problem for soils and vegetation.

Alternative C would add an average of 350 program participants and staff per day. Although this is similar to the numbers of navy personnel occupying the base, it is likely that a higher percentage of these participants would use the trails and other park facilities.

Assuming only 20–25% use the facilities (similar to other visitors and to 2001 base personnel), 75–85 program participants would regularly use park trails. This is a 90+% increase over No Action with associated minor to major localized impacts to trail and other park facility vegetation.

As noted in the analysis of Alternative B, trail use will be limited in fragile natural areas to reduce impacts to vegetation.

Applying appropriate trail building and maintenance standards to the Sundew Trail could reduce erosion and associated loss of vegetation. Assuming limited use, the application of NPS standards, and the revegetation of social trails, the impact of program use on the Sundew Trail is likely to be negligible. However, since NPS standards are already applied to trails leading from Schoodic Head, an increase of use by more than 90% compared to No Action could result in major adverse impacts to the trails' soils and vegetation. Guided use may reduce impacts to moderate, but mitigation in the form of closures, replanting, erosion control, and other actions would be required to reduce impacts further. The impact of trail use to vegetation in the entire study area is negligible.

The addition of this many program participants to the area could also have adverse impacts on vegetative communities on the peninsula. While the types of impacts described above in Alternative B to vegetation, such as shearing, trampling, and soil changes resulting in indirect losses of vegetation, would remain the same, the magnitude could increase. Again as in Alternative B, the vegetation between the base and these communities would be at risk. Because the disturbance may be moderate, decreases in biomass, vertical complexity, and species diversity are possible. The degree of impact is unknown. It could range from negligible to major, and depends on the susceptibility of the vegetation itself and the degree of use. Mitigation measures NPS might explore to lessen impacts to this particular vegetation include restricting access, or building a trail to access plant communities that students particularly are interested in studying. While restricting access would reduce or eliminate the impact, building a trail would require the

removal of some vegetation with resulting minor adverse impacts. A trail would also be likely to increase use of these sensitive areas by encouraging general visitor use of such a trail. It would prevent further destruction of vegetation from "cross-country" travel, however. Because these impacts would be localized, there is no threat of impairing park vegetation as a result of implementing Alternative C.

Alternative C would result in the removal of 10 buildings on the base and the revegetation of about 16 acres of disturbed land. This is an approximate 15–20% improvement over No Action, and a moderate localized benefit to vegetation on the base. It is a negligible benefit to vegetation over the entire study area.

**Cumulative Impacts** - Cumulative impacts would be the same as for No Action.

**Conclusions** - Impacts identified in the "Conclusions" section above under No Action and resulting from activities common to all alternatives would apply to Alternative C as well. These include benefits associated with identifying acceptable visitation over time, revegetating existing social trails on Little Moose Island, application of NPS policies regarding invasive plants, possible acquisition of a conservation easement on property to the north of the park, and the removal of unused structures, such as the perimeter fencing. Increases in visitation over the life of the plan would remain the same, resulting in the same impacts to vegetation along park trails.

Assuming similar use patterns by program participants as other visitors, trails to and from Schoodic Head and elsewhere in the Schoodic District would experience minor to major localized impacts compared to No Action. Directed program use could increase impacts to major.

Mitigation, including closures, erosion control, and replanting would reduce impacts. Impacts to fragile areas like the Sundew Trail could be offset to negligible by revegetating social trails, applying trail building and maintenance standards, and limiting use.

Localized negligible to major impacts, depending on the susceptibility of the vegetation and

the degree of use, could result from program participants accessing sensitive areas of the site, so such use would be monitored and mitigated as necessary.

No impairment to park vegetation would occur if this alternative were selected.

## **COASTAL RESOURCES**

### **Impacts Common to All Alternatives**

The study area includes sensitive intertidal areas, as well as additional brackish or saltwater wetlands. Visitor use to these areas could reduce biological diversity through trampling by foot traffic, harvesting of intertidal organisms for food, fish bait, aquariums, etc., and through the removal of rocks and other materials such as dead shells that serve as habitat for many invertebrates (Adessi 1995, Murray et al. 1999). Despite a lack of quantitative data, these actions are generally considered responsible for serious declines in the biological diversity of rocky intertidal organisms, particularly in high growth areas, or areas where no restrictions, information, or protection for these organisms exists (Murray et al. 1999).

At this time, visitor use of any of these intertidal areas is quite low; however, all alternatives include the inventorying and monitoring of natural resources, and the use of this information along with studies to determine acceptable visitation over time. They also all include the application of zoning and the control of visitor use in fragile areas to protect resources in those areas from the impacts of visitors. These measures may include signs, information packets, the requirement for permits to enter, or the partial or complete closure of areas to visitation.

Inventorying or monitoring these sites to record changes and take needed steps to prevent damage from overuse may be critical in maintaining them in their present state, and could provide minor to moderate benefits in this regard.

Inventorying, monitoring, and possible restrictions may also benefit coastal wildlife in the study area, particularly nesting seabirds. For example, Schoodic Island has been designated a

state "Significant Wildlife Habitat" because it is a critical nesting site for seabirds. It is particularly important as a nesting area for common eiders, which occupy the island from May through mid-July. A 1996 study (Mittelhauser et al. 1996) recorded regular disturbances by visitors of nesting common eiders and gulls. The presence of humans caused adult birds to flush from the nest, leaving the eggs and chicks vulnerable to predation or cold weather and hatch failure (Kuss et al. 1990). Researchers visited the island at least twice during the preparation of the 1996 study, and found 15 people traversing nesting habitat and flushing birds in one case, and their own activities having the same effect in another, despite restricting their actions to the shoreline to minimize disturbance. Both times, gulls ate the unprotected eggs and were able to kill many of the exposed chicks. This phenomenon is supported by earlier studies (Maine Department of Inland Fisheries and Game 1974). Birdwatching and human disturbance were identified as serious threats to seabirds in the study area during nesting and may have already had moderate or even major impacts to nesting success of seabirds on Schoodic Island. Although Schoodic Island is closed to pets during the nesting season, closing the island to visitors, particularly between March 15 and August 31, or posting informational signs during the nesting season could result in moderate or major localized benefits for common eiders and other nesting seabirds on Schoodic Island.

In addition, regardless of the alternative, NPS will revegetate existing social trails on Little Moose Island, and create a 0.75-mile trail to allow the public access without further degradation. Some of these social trails lie along the tidal bar separating the island from Schoodic Peninsula. Creating a clearly marked trail and blocking off and revegetating existing social trails could reduce impacts to coastal vegetation on this intertidal area, with resulting moderate localized benefits.

### **Impacts of Alternative A: No Action**

**Analysis** - The rocky intertidal areas that are particularly species rich or pristine are accessed by the Sundew Trail originating on the base (NPS staff, personal communication, October 2002). When the navy base was active, the trail

was essentially unavailable to park visitors. The undisturbed nature of the intertidal zone along the west side of Big Moose Island indicates human impacts have been minimal. This is very likely to continue if the No Action Alternative is selected, as even if the site is used by NPS for educating the few program participants anticipated to use the base, they will be led by park staff who will ensure impacts are minimized. As with any NPS property, collecting will be prohibited unless a specific research permit is issued.

Parking areas in the vicinity of the two estuarine systems in the study area, at Frazer Point and in the vicinity of West Pond, experience greater visitation than the rocky intertidal areas described above. The average number of cars parked at the Frazer Point lot varies from 0 to 22 between the hours of 8:00 a.m. and 12:00 p.m. West Pond pull-off has an average of 0–4 cars. At low tide, visitors are able to cross over to Pond Island, with possible impacts from trampling to vegetation or fauna in the intertidal area. However, casual observations indicate the tidal bar connecting Big Moose Island and Pond Island, the only spot where foot access is possible, does not appear to be experiencing noticeable effects. The majority of visitors to Pond Island canoe across West Pond and land on the beach on the southeastern side of the island. A relatively recent study of several islands in the park (Mittelhauser et al. 1996) concluded "visitation was infrequent and number of visitors low" with "minimal amounts of trash" as evidence of human impact recorded. Recent anecdotal observations support these conclusions, suggesting few people actually make it out to the island, either by foot or canoe (Mittelhauser et al. 2002).

Mosquito Harbor, located near Frazer Point, is mostly submerged during the tidal cycle, although some of the shoreline is uncovered during low tide. The shore is deep mud, and some use for clamming or collecting marine worms is possible. For the most part, visitors keep to firmer sandy soils and rocky areas, or fish off the dock near the outfall of the harbor.

Under the No Action Alternative, the very small number of staff and summer program participants at the base will add about 3% more

people to the area than if no staff or programs were located on site. Visitation would continue to increase at about 1% per year, exerting a very slow increase in impact on existing use at intertidal areas. To the extent that navy personnel visited these areas when the base was fully occupied, the impact of many fewer people on base could be beneficial for coastal flora and fauna. However, since the rocky intertidal area accessible only by base personnel is in pristine condition, it appears navy personnel had little or no adverse impact on intertidal biota. In addition, visitors only rarely seem to use the gravel or mud flats at Frazer Creek or Pond Island. Use of this coastline or any of the significant intertidal areas in the study area by program participants would likewise be very low impact, as participants would either be guided or fully informed of restrictions. Therefore only negligible differences in impact to intertidal areas compared to existing conditions would be expected under this alternative. An exception to this may be some slight improvement in conditions in the tidal bar linking the peninsula to Little Moose Island. A large percentage (40–45%) of navy base personnel indicated they used the park for hiking or viewing nature. Although the survey did not specifically address their use of Little Moose Island, its rare plants and physical location near the base may have made it an ideal candidate for these activities. A reduction in the number of people on the base may therefore result in reduced use of and impact to coastal vegetation in the area between the peninsula and Little Moose Island. The degree of such a benefit is unknown, but may be a minor or even moderate one compared to 2001 conditions if use by base personnel was intense.

As described above under "Impacts Common to All Alternatives," visitor use and resulting disturbance of nesting seabirds on Schoodic Island is already having noticeable and possibly serious impacts. If some of these visitors were base personnel, closing the base and allowing only a maximum of 20 program participants and staff onto the site could offer relative benefits to the birds nesting on Schoodic Island. The degree of such a benefit is unknown, and depends on the visitation to the island by base personnel. Even if a few base personnel used the island, the relative benefits of reducing this

use could be moderate or major for nesting seabirds.

**Cumulative Impact** - Impacts to intertidal areas in the region are similar to those described above. In addition to impacts from human trampling and collecting, they may experience impact from oil spills, sewage outfalls, and increased pollution. In some areas, the impact is severe enough that local communities are involved in educational programs for their citizens, such as the "tidal etiquette" program recently created in Kennebunk, Maine (Feurt 2001). In light of impacts to intertidal areas not under public protection, ensuring the protection of those in the park may be particularly important.

The population of common eiders in Maine has appeared to decline in recent years as the hunter harvest has increased. In Maine, harvest of waterfowl, including common eiders, has increased from 3–4% in the 1960s to over 20% in the mid-1980s and a recent high of 29% of the population in 1996 (Maine Department of Inland Fisheries and Wildlife 2001). Harvests in Nova Scotia and New England have doubled in recent years, and changes in the 1998 hunting season to reduce the harvests were implemented as a result. In 1999, Maine reduced its bag limit of common eiders to a maximum of five, required the use of steel shot to prevent lead poisoning of waterfowl, and has used money from the sale of waterfowl hunting stamps and art prints to acquire and improve habitat. Statewide over the last ten years (1990–2000), the number of common eiders has averaged 41,800, with significantly fewer (36,722) in the most recent five of those years.

**Conclusions** - Possible negligible to moderate benefits to coastal vegetation lying between Little Moose Island and the peninsula associated with controlled visitor use and restoring existing social trails might result under any of the alternatives. Inventorying, monitoring, and applying visitor controls, when needed, to intertidal or other coastal resources, actions common to all alternatives, may prevent the condition of these resources from deteriorating. Currently, some intertidal areas, as well as brackish mud and gravel flats, and sub-tidal areas in the study area, are in relatively pristine

condition and appear to receive only very limited visitor use. Increased use associated with increased visitation over time and a small number of program participants at SERC are not expected to result in more than negligible adverse or beneficial changes to these resources, with the exception of a possible minor or even moderate benefit to coastal resources in the tidal bar and brackish wetland between Little Moose Island and the peninsula. Significant statewide reductions in the common eider population have occurred recently; reductions in use on Schoodic Island associated with base closure, monitoring, and possible restriction could offer negligible to major benefits locally, and negligible to minor benefits to the state population of common eiders or other seabirds. No impairment to park coastal resources would occur.

#### **Impacts of Alternative B: National Park Service Management**

**Analysis** - Under Alternative B, about 18% more people will be using the entire study area than under the No Action Alternative. Intertidal zones may well draw program participants, and groups of students or researchers may be frequently visiting these sites. Those sites closest to the base, such as Little Moose Island and the rocky intertidal area accessed by the Sundew Trail, may be most at risk. Impacts would primarily be limited to those associated with trampling, as collecting would not be allowed under normal circumstances. However, these can be serious, as described above under "Impacts Common to All Alternatives." The benefits to coastal resources in the vicinity of the tidal bar between Little Moose Island and the peninsula attributable to reduced use under Alternative A would either not be as apparent in this alternative, or disappear altogether depending on the level of interest by program participants. Closing the area to unaccompanied visitors or students and limiting the number of accompanied students, visitors, or researchers allowed to visit the site would reduce impacts.

Program participants may also be more likely than general visitors to explore and strike out on their own to find interesting natural areas farther from the base to study. The intertidal

areas surrounding Big Moose Island may be tempting for some. Since most of the coastal resources in the study area receive relatively little use, directed program use could have relatively large impacts, ranging from minor to even locally major compared to the No Action Alternative. For example, whereas most visitors do not cross a relatively deep area to access Pond Island or walk out onto mud flats in Mosquito Harbor during low tide, program participants may be more willing to venture out into these zones. Although the mudflats, gravel beaches, and rocky areas without tide pools are likely to be able to withstand increased use without noticeable impact, increased trampling of vegetation on tidal bars to Little Moose Island and Pond Island could have larger-scale effects. Monitoring and applying restrictions if needed will keep impacts to negligible or minor.

Little Moose Island receives quite a bit of use, and, although the degree to which navy personnel used these resources is unknown, they likely did not contribute to impacts. The types of impacts this use is having are detailed above, and include trampling of vegetation. The negligible to moderate benefits to Little Moose Island with base closure would likely be offset with increased program use of the entire area under Alternative B. If students are allowed to visit these areas without restrictions, education, or guided use, the impacts could be readily apparent (moderate) or even severe (major) in some cases. Restrictions in particular could reduce these impacts so they are slight (minor) or nearly undetectable (negligible).

If the Schoodic Education and Research Center creates enough demand, it is possible that the privately owned and operated ferry service between Bar Harbor and the peninsula would be expanded along with connections to the Island Explorer bus system. No sites inside the park are available to accommodate a ferry service. However, creating the SERC may increase demand for transportation between the main part of the park on Mount Desert Island and the peninsula enough that ferry service expansion would occur. Although not solely a federal action, the impacts are generally addressed in this *Environmental Impact Statement*.

An expanded ferry service would use smaller boats (less than 65 feet), as demand would not support large ferries. A recent study looked at both monohull and catamarans as options. This study found that a summer seasonal ferry service offering 10–15 trips per day (combined recreational and commuter traffic) would be sustainable at levels of base use between Transportation Alternatives 2 and 3 (U.S. Department of Transportation 2002). All would cross Frenchman Bay. This increase in boat traffic in the bay may have some negligible impacts to marine mammals, including from engine noise and resulting interference in whale and dolphin communications, collisions, leaks of fuel from boat engines, and the disturbance some wildlife experience from the presence of humans or machines. Pelagic birds or birds occupying shorelines along the ferry route might also be adversely affected by the presence of humans and noise, and by disruption of open ocean feeding patterns. Wildlife, including nesting or sensitive seabirds along the coast of islands between Bar Harbor and Winter Harbor, may abandon their nests as boats pass, leaving chicks vulnerable to cold and predation. Studies have found repeated interruptions of feeding or nesting can result in reduced reproductive success (Burger 1995). Because Schoodic Island lies to the east of the peninsula, nesting birds on it would not be affected by ferries between Bar Harbor and Winter Harbor.

**Cumulative Impacts** - In addition to the impacts identified above for No Action, cumulative impacts for Alternative B would include increased boat traffic in Frenchman Bay, and increases in visitation to islands or other coastlines where wildlife feed, nest, or rest. The shorelines the ferry route is most likely to affect would be those along Bald Porcupine Island, Stave Island, Jordan Island, Ironbound Island, and Grindstone Neck. Expanded use of the Island Explorer transit system would reduce vehicular traffic.

**Conclusions** - The same benefits to coastal resources on Little Moose Island from controlling visitor use, inventorying and monitoring, and revegetating social trails as described in the "Conclusions" section for Alternative A would occur. Increased use of the intertidal areas by



students or researchers could result in moderate or even major localized damage to areas considered pristine compared to the No Action Alternative. Education, restrictions, monitoring, and closures may be required to keep impacts from becoming severe.

Benefits to coastal resources in the tidal bar and brackish wetland between Little Moose Island and the peninsula, or on Schoodic Island derived from reductions in use in Alternative A would be offset by increased program use. If students are allowed to visit these areas without restrictions, education, or guided use, the impacts could be readily apparent (moderate) or even severe (major) in some cases. Restrictions in particular could reduce these impacts so they are slight (minor) or nearly undetectable (negligible). However, impacts to common eiders would be additive and adverse, rather than beneficial and mitigating. An expanded ferry and transit service, if warranted, could have negligible impacts to marine mammals, or pelagic or coastal wildlife from engine noise, collisions, and the presence of humans. No impairment to park coastal resources would occur.

#### **Impacts of Alternative C: Collaborative Management (Preferred)**

**Analysis** - Under Alternative C, nearly 50% more people will be using the study area than under the No Action Alternative, and use of the base will increase 17–18-fold from 20 to 350 each day. As noted above in Alternative B, because intertidal areas may be the focus of classes or research conducted at the Schoodic Education and Research Center, use would need to be monitored or restricted to ensure impacts to pristine resources are not adversely affected. The chance of such an impact would increase substantially under this alternative compared to No Action. Coastal resources most at risk may be those closest to the base, such as the rocky intertidal area accessed by the Sundew Trail, and Little Moose Island.

The NPS could reduce the likelihood of extensive impacts by closing the area to unaccompanied visitors or students, and by limiting the number of accompanied students, visitors, or researchers allowed to visit the site.

Intertidal zones and other attractions farther from the base, including West Pond and the Frazer Creek/Mosquito Harbor mudflats, may also be appealing areas for students to visit. For those areas currently receiving little use, directed program use of this magnitude could have relatively large impacts, ranging from moderate to locally major compared to the No Action Alternative. Although the mudflats, gravel beaches, and rocky areas without tide pools are likely to be able to withstand increased use without noticeable impact, increased trampling of vegetation on tidal bars between Little Moose and Pond islands could have larger-scale effects. Monitoring and applying restrictions if needed will keep impacts to negligible or minor.

As noted above, Schoodic Island and Little Moose Island both receive quite a bit of use, and although it is unknown to what degree navy personnel used these resources, it is likely they did contribute to use and associated impacts at both locations. If students are allowed to visit these areas without restrictions, education or guided use, the impacts could be moderate or even major in some cases. Restrictions in particular could reduce these impacts so they are minor or negligible.

The chances of economic success for a ferry are considered highest in Alternative C. No separate study of ferry service for the number of visitors expected under this alternative was conducted; however, it is likely that demand would require an increase in the number of ferries compared to Alternative B. In other words, it is more likely that summer ferries would make about 15 trips in this alternative, rather than the 10 or so in Alternative B. This increase in boat traffic in the bay may have some negligible or minor impacts to marine mammals, including from engine noise and resulting interference in whale and dolphin communications, collisions, leaks of fuel from boat engines, and the disturbance some wildlife experience from the presence of humans or machines. Pelagic birds or birds occupying shorelines along the ferry route might also be adversely affected by the presence of humans and noise, and by disruption of open ocean feeding patterns. Wildlife, including nesting or sensitive seabirds along the coast of islands

between Bar Harbor and Winter Harbor, may abandon their nests as boats pass, leaving chicks vulnerable to cold and predation. Because Schoodic Island lies to the east of the peninsula, nesting birds on it would not be affected by ferries between Bar Harbor and Winter Harbor.

**Cumulative Impacts** - Cumulative impacts would be the same as those reported for Alternative B.

**Conclusions** - The same benefits to coastal resources on Little Moose Island from controlling visitor use, inventorying and monitoring, and restoring social trails as described in the "Conclusions" section for Alternative A would occur. Increased use of the intertidal areas by students or researchers could result in moderate or even major localized damage to areas considered pristine compared to the No Action Alternative. Education, restrictions, monitoring, and closures may be required to keep impacts from becoming severe.

Benefits to coastal resources in the tidal bar and brackish wetland between Little Moose Island and the peninsula or on Schoodic Island derived from reductions in use in Alternative A would be offset by increased program use. If students are allowed to visit these areas without restrictions, education, or guided use, the impacts could be moderate or even major in some cases. Major impacts are more likely than in Alternative B. Restrictions in particular could reduce these impacts so they are minor or nearly negligible. However, impacts to common eiders would be additive and adverse, rather than beneficial and mitigating. An expanded ferry and public transit system, if warranted, could have negligible or minor impacts to marine mammals, or pelagic or coastal wildlife from engine noise, collisions, and the presence of humans. Use of the Island Explorer transit system would reduce vehicular traffic. No impairment to park coastal resources would occur.

## **WILDLIFE**

### **Impacts Common to All Alternatives**

All alternatives include the inventorying and monitoring of natural and cultural resources, and the use of this information along with studies to determine acceptable visitation over time. They also all include the application of zoning and the control of visitor use in important wildlife habitat to protect resources from the impacts of visitors. These measures may include signs, information packets, the requirement for permits to enter, or the partial or complete closure of areas to visitation. Candidates for the special application of protective measures and the protected natural area subzone include islands, wetlands, estuaries, intertidal zones, and other critical habitat, including Maine's "Rare or Exemplary Natural Communities," "Essential/Significant Wildlife Habitat," and rare plant locations. These measures could dramatically improve conditions at some of these communities, particularly on affected islands.

For example, Schoodic and Rolling islands may be occupied by bald eagles, which nest between April and June (Maine Department of Inland Fisheries and Game 1974). Bald eagles can be quite sensitive to the presence of humans, and can abandon their nests for hours in response to humans in boats or on foot near their nests, leaving eggs vulnerable to cold (Grubb et al. 1992). Flushing the nest can also adversely affect adult eagles through energy loss, and slow-moving boats, such as kayaks or canoes, can disrupt eagle feeding. If noise or activity is frequent, some eagles may abandon a nest for a season or not return to it the following year (Knight and Cole 1995). Although Schoodic Island is closed to pets during the nesting season, closing the island to visitors, particularly during early and late spring, or posting informational signs during the nesting season could result in minor to major localized benefits for nesting bald eagles.

All alternatives include the proposed acquisition of a conservation easement on all or part of the 1,600-acre privately owned tract between the Schoodic District's northern boundary and State Route 186 in Winter Harbor. A conservation easement could restrict or limit develop-

ment. The location and relatively undisturbed nature of this land make it an important migration corridor between forests to the north and the Schoodic Peninsula for mammals found nowhere else in the park.

At least 41 species of mammals are present on the Schoodic Peninsula. This includes several larger species such as moose, bobcat, and fisher, which are rare or absent elsewhere in the park. Acquiring a conservation easement would help continue to preserve this acreage as habitat for wildlife and preserve high mammalian species diversity and the presence of larger species on the peninsula, a minor to major benefit depending on the planned use of the property without NPS protection.

All alternatives also involve the removal of some unused structures in the study area, such as the perimeter fencing. Restoration of these few acres would provide a negligible benefit to wildlife in the study area. It is also possible that wildlife now kept from accessing the base by the fencing will either find habitat on the site, or be disturbed by construction activities or the presence of human activity.

#### **Impacts of Alternative A: No Action**

**Analysis** - Visitation would continue to increase slowly over the 10-15-year time frame of the plan by about 1% per year. Over 15 years, this could mean an increase in use of trails and park facilities of about 15%, with resulting adverse impacts to wildlife, particularly animals on or near existing trails in the park between Schoodic Head and the coast. These impacts would result from the presence of humans, noise, and habitat destruction associated with foot traffic. Although this may have a negligible or minor impact on wildlife in the vicinity of the trails, compared to activities when the base was in operation, the number of people in the study area, and particularly on the base, would be significantly lower, even several years from the time this alternative is implemented. This reduction in use could offer benefits to wildlife both on the base, and on park property nearest the base. For example, use of the Sundew Trail, Schoodic Head trails, Little Moose Island, and perhaps Schoodic or Rolling islands might

decrease, with resulting positive impacts on wildlife relative to 2001 conditions. Islands in the study area may also act as refuges for other species of birds whose populations in the area of the park have fallen because of human disturbance, such as purple sandpipers. These species could also benefit from base closure, although the extent of such benefits is unknown.

Because few people live at the former base, most of the buildings would be in layup and perimeter fencing would be removed, it is likely that wildlife would experience a benefit relative to 2001 conditions through the addition of habitat on base as well. Vegetation, some of it native, would likely begin to take over unmaintained parking areas, pathways, or other open areas, and without the presence of park staff, wildlife would occupy these areas. Upland bird and smaller mammal species are the most likely inhabitants. The extent of these impacts is unknown, but likely to be negligible.

**Cumulative Impacts** - Some species of wildlife, particularly birds or other migratory species, have experienced adverse effects from human activities, including the removal of habitat, noise, pollution, and in some cases harvesting. Neotropical bird species, for example, travel thousands of miles along routes where human development may have removed very large blocks of resting or feeding habitat. Many species have been suffering long-term declines as a result (Famous 1999). The Schoodic Peninsula, however, is relatively undisturbed. In the study area, the primary human activities and their related impacts have come from visitors to the park and base operations. With the removal of military operations and personnel from the base, a negligible to minor cumulative positive impact to wildlife should occur.

Bald eagles have been monitored in the park since 1962. Productivity (eaglets fledged/nesting pair) declined continuously from 1960 to 1975 and more than 50% of nesting territories in the area of the park and Frenchman Bay were abandoned during this time. In the entire 15 year period, only seven eaglets were successfully fledged (Owne, Jr. and Hodgman 1989). A supplemental feeding program was initiated in 1985 to reestablish resident eagles in this area, and productivities have dramatically improved

to exceed state-wide averages since then. Productivity for the site in the years 1987–1992 equaled 0.812, whereas for the state, productivity was 0.762 eaglets/nesting pair. Increased waterfront development in the Frenchman Bay region, tour boats, and human disturbance of nests are considered the most serious threats to continued eagle nesting success in the study area (Owen, Jr. and Hodgman 1989).

**Conclusions** - Identifying acceptable visitation over time and providing information through signs, brochures, permits, and controlled access could bring major localized benefits for some species, including the federally threatened bald eagle. Acquisition of a conservation easement on property to the north of Schoodic Unit could provide a minor to major benefit to peninsula wildlife by protecting a large block of forest habitat used for migration to and from the study area, especially by large mammals. Negligible to minor impacts to wildlife from increased visitation may occur. A negligible to minor cumulative, positive impact from the reduction in human activity on the base, the removal of fencing, and the layup of buildings is likely. Additional ongoing cumulative benefits from the relatively undisturbed and unpolluted nature of the study area to bald eagles and to neotropical and shorter-distance migratory birds would continue. No impairment of park wildlife would occur.

#### **Impacts of Alternative B: National Park Service Management**

**Analysis** - Adding 150 program participants and staff per day to an estimated 700 visitors (averaged over the 12 months of the year and weighted over the 15–20 year life of the plan) to the peninsula would increase use of the entire study area by about 18% compared to No Action. Assuming they use the same park facilities at the same rate as existing visitors, the simple increase in numbers could have an adverse impact on wildlife in the study area through disturbance and displacement, particularly near trails or on the former base. The former base and habitat adjacent to trails in the study area have been frequented by humans for several decades and are lower-quality wildlife habitat as a result. Therefore, the impact to wildlife from use of either area would be negligible to minor.

However, program participants may be attracted to higher-quality habitats in the study area in an effort to find and observe wildlife. Some species of wildlife and some individuals of each species are more susceptible to human disturbance, and humans on foot can be particularly disruptive. Wildlife running or flying from humans can experience adverse impacts from at least two sources: they stop eating when they are disturbed, and they expend energy to escape. The loss of nutrients or increased energy expended can ultimately mean that reproduction, migration, or even survival are compromised (Mattfield 1974, Bowles 1995). Species that occupy nearly every habitat in the study area could be affected, particularly if program participants or visitors travel off trails to access wetlands, streams, shorelines, or other wildlife habitat. Nesting birds or sensitive or denning mammals may be particularly susceptible. If the use of the area is regulated or guided by park staff, the impacts would be reduced and likely confined to trails or less sensitive areas. Assuming guided use, the impact of program use to sensitive or breeding wildlife is likely to be no more than minor. It is possible that program participants may attempt to access islands in the study area, which are theorized to act as refuges for some species, particularly birds, whose populations in the area of the park have fallen because of human disturbance. Directed or unregulated program use of these islands could result in minor or moderate impacts to these species.

Alternative B would dramatically increase the number of humans compared to No Action, and would add overnight use of up to 150 participants. The noise and presence of human activity during the day would have adverse impacts on wildlife occupying the base. Night lighting, noise, and the presence of humans 24 hours a day on the base would have additional impacts, particularly to nocturnal wildlife. Many mammals are either wholly or chiefly nocturnal, including raccoons, skunks, bats, mice, bobcat, and coyotes. It is possible that those on Big Moose Island may have tolerated disturbance nearby or on the base because they are able to roam freely at night. Conditions for these species and all wildlife on base would improve for Alternative A relative to 2001 conditions. However, in Alternative B, those nocturnal species otherwise tolerant of humans during the

day may experience a minor or moderate adverse impact from nighttime occupation.

Alternative B would result in the removal of 10 buildings on the base and the restoration of about 40 acres of disturbed landscape. This would be a minor beneficial impact to some species of wildlife in the study area, particularly those amenable to habitat adjacent to developed areas such as raccoons, coyotes, feral cats, and skunks. Bird species that require scrubby habitat would also benefit from the removal of buildings. As the brush changes over time to a forest ecosystem, wildlife species common to this habitat would benefit.

The Rockefeller Building would likely be landscaped with vegetation similar to that when it was first built. The removal of existing vegetation could have an undetectable or negligible localized effect on wildlife utilizing existing habitat in these locations.

If the Schoodic Education and Research Center creates enough demand, it is possible that the privately owned and operated ferry service between Bar Harbor and the peninsula would be expanded. A recent study found that a seasonal (summer) ferry service offering 10–15 trips per day (combined recreational and commuter traffic) would be sustainable at levels of program use falling somewhere between those predicted in alternatives 2 and 3 (U.S. Department of Transportation 2002). All would cross Frenchman Bay. This increase in boat traffic in the bay may have some impacts to feeding bald eagles, which can be both actively and passively disturbed by slower-moving boat traffic. Active disturbance includes flushing or flying away from the boats because of noise or the presence of humans. Studies have found repeated interruptions of feeding or nesting can result in reduced reproductive success (Burger 1995). An example of passive disturbance is the avoidance of an area where boats are moving or anchored. In one study (McGarigal et al. 1991), breeding bald eagles typically avoided foraging within 0.25 mile of a stationary boat as long as it was in place, in this case throughout the breeding season. This form of disturbance could be quite prevalent in the summer in Frenchman Bay from increases in all types of boat traffic including

ferries, and potentially more disturbing than active displacement because it can prevent an eagle from obtaining adequate food resources (Anthony et al. 1995). The degree of impact would be minor to moderate—that is, no critical habitat would be affected over the long term—and no impacts at a park or regional level to the eagle population could be attributable to ferry traffic.

**Cumulative Impacts** - Cumulative impacts would be the same as for No Action.

**Conclusions** - As in Alternative A, identifying acceptable visitation over time and providing information through signs, brochures, permits, and controlled access could bring major localized benefits for some species, including the federally threatened bald eagle. Acquisition of a conservation easement on property to the north of the Schoodic Unit could provide a minor to major benefit to peninsula wildlife by protecting a large block of forest habitat used for migration to and from the study area, especially by large mammals. Negligible to minor impacts from increased visitation to some wildlife may occur. Guided use or restrictions could keep impacts to wildlife from program participants accessing higher-quality habitat to no more than minor. Directed or unregulated program use of islands in the study area could result in minor or moderate impacts on species who occupy habitat on them specifically to avoid humans.

Increased use of the former base and overnight use could have additional minor to moderate impacts on some nocturnal mammals, and negligible impacts on other wildlife compared to No Action. A minor beneficial impact from the restoration of about 40 acres of land on the base is likely. The establishment of a ferry system to the peninsula could have minor to moderate impacts on feeding eagles. A negligible to minor cumulative, positive impact from the reduction in human activity on the base, the removal of fencing, and the layup of buildings is likely. Additional ongoing cumulative benefits from the relatively undisturbed and unpolluted nature of the study area to bald eagles and to neotropical and shorter distance migratory birds would continue. No impairment of park wildlife would occur.

### **Impacts of Alternative C: Collaborative Management (Preferred)**

**Analysis** - Adding 350 program participants and staff per day to an estimated 700 visitors to the peninsula would increase use of non-base park facilities by about 45% compared to No Action. Assuming they use the same facilities at the same rate as existing visitors, the simple increase in numbers could have an adverse impact on wildlife in the study area through disturbance and displacement, particularly near trails or on the former base. As noted above, both the old base and habitat adjacent to trails in the study area have been frequented by humans for several decades and are lower-quality wildlife habitat as a result. Therefore, the impact to wildlife from use of either area would be minor.

However, as noted above in Alternative B, program participants may be attracted to higher-quality habitats in the study area in an effort to find and observe wildlife. Species that occupy nearly every habitat in the study area could be affected, particularly if program participants or visitors travel off trails to access wetlands, streams, shorelines, or other wildlife habitat. Nesting birds or sensitive or denning mammals may be particularly susceptible. If the use of the area is regulated or guided by park staff, the impacts would be reduced and likely confined to trails or less sensitive areas. Assuming guided use, the impact of program use to sensitive or breeding wildlife is likely to be no more than minor. However, it is less likely that the activities of 350 program participants with a variety of partner occupants of the base can be completely controlled, and moderate impacts in some particularly attractive locations are possible from human disturbance. It is possible that program participants may attempt to access islands in the study area, which are theorized to act as refuges for some species, particularly of birds, whose populations in the area of the park have fallen because of human disturbance. Directed or unregulated program use of these islands could result in minor or moderate impacts to these species.

Alternative C would dramatically increase the use of the base compared to No Action, both during the day and at night. Up to 350 program

users would be on base during the day, and up to 190 would be allowed to spend the night. Night lighting, noise, and the presence of humans 24 hours a day on the base may disturb nocturnal wildlife in particular. It is possible that some participants, or even some of the courses or programs offered, may seek to experience nocturnal wildlife in their habitat at night. Many mammals are either wholly or chiefly nocturnal, including raccoons, skunks, mice, bobcat, and coyotes. Those on Big Moose Island may tolerate habitat near or on the base because they are able to roam freely at night. The addition of up to 190 overnight guests and the possibility of deliberate attempts to view nocturnal wildlife would result in at least temporary disturbance, and possible temporary or permanent displacement. Nocturnal mammals in the vicinity could experience moderate impacts from these activities.

Alternative C would result in the removal of 10 buildings on the base and the restoration of about 15 acres of disturbed land. This would be a minor beneficial impact to some species of wildlife in the study area, particularly those amenable to occupying habitat adjacent to developed areas such as raccoons, coyotes, and skunks.

As in Alternative B, the Rockefeller Building would likely be landscaped with vegetation similar to that when it was first built. The removal of existing vegetation could have an undetectable or negligible localized effect on wildlife utilizing existing habitat in these locations.

Expanded ferry service between Bar Harbor and the peninsula would probably be most likely if Alternative C were implemented. The same types of impacts to feeding bald eagles, including active and passive disturbance, as described in Alternative B would be even more problematic. The extent of such impacts is unknown, but the actual impact of just ferry traffic is likely to be minor to moderate compared to existing use of Frenchman Bay by boaters.

**Cumulative Impacts** - Cumulative impacts would be the same as for No Action.

**Conclusions** - As in Alternative A, identifying acceptable visitation over time and providing

information through signs, brochures, permits, and controlled access could bring major localized benefits for some species, including the federally threatened bald eagle and other nesting birds such as the common eider. Acquisition of a conservation easement on property to the north of the park could provide a minor to major benefit to peninsula wildlife by protecting a large block of forest habitat used for migration to and from the study area, especially by large mammals. Negligible to minor impacts from increased visitor and program use to some wildlife may occur. If program participants are guided or controlled by park staff, an additional minor impact to wildlife from increased access to higher-quality habitat is possible. Directed or unregulated program use of islands in the study area could result in minor or moderate impacts to species who occupy habitat on them specifically to avoid humans. Because it may be more difficult to control 350 program participants and multiple partners, moderate impacts from visitation to habitat of sensitive species, and from deliberate attempts to view nocturnal wildlife are possible. A negligible to minor beneficial impact from the restoration of about 15 acres of land on the base is likely. Expansion of the ferry system to the peninsula could have minor to moderate impacts on feeding eagles. A negligible to minor cumulative positive impact from the reduction in human activity on the base, the removal of fencing, and the layout of buildings is likely. Additional ongoing cumulative benefits from the relatively undisturbed and unpolluted nature of the study area to bald eagles and to neotropical and shorter-distance migratory birds would continue. No impairment of park wildlife would occur.

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## IMPACTS TO CULTURAL RESOURCES

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### Impacts Common to All Alternatives

The Schoodic District has not been systematically inventoried for archeological resources, which is proposed under all alternatives. This action would fulfill NPS's proposed resource management objective of ensuring that all management decisions are based on full consideration of the best available cultural resource information (NPS 2002). Due to lack of data and the

number of undocumented sites, archeological resource conditions are not currently quantifiable, which makes an accurate assessment of the impact of ongoing and proposed actions difficult. Completion of the proposed inventory and monitoring program would result in a minor to major benefit to archeological resources at the Schoodic District, depending on the scope and depth of such surveys. The NPS currently surveys an area before activities that could impact buried or other cultural resources take place. Continuing this activity will continue to prevent damage to individual cultural resources. However, a survey of the entire study area would provide additional benefits.

Under all alternatives, baseline data and surveys are proposed for use in identifying acceptable visitation that can be monitored over time. The simultaneous monitoring of visitation and conditions of cultural resources through time would allow for necessary adjustments to be made to adequately preserve and protect resources. Since cultural resources (especially buried or surface-exposed archeological resources) are vulnerable to impacts of human use (e.g., foot traffic, overuse, vandalism, looting), the determination of appropriate visitor levels could provide important protection, and offer minor to major benefits for archeological and other cultural resources.

All alternatives include the removal of the perimeter fencing at the former navy base. These removal operations would involve ground disturbance that has the potential to impact buried archeological resources, primarily through the loss of cultural context of artifacts, features, etc. Fence removal is considered to pose a negligible, site-specific adverse impact in its potential to affect buried cultural deposits, both because a recent reconnaissance study (Berger & Assoc., Inc. 1999) suggests the probability of a significant archeological site is low in this area, and because the ground has already been disturbed by the structure and fence. This potential could be mitigated to negligible by the involvement of a professional cultural resource specialist in advance of any ground-disturbing activities.

All alternatives share a common goal of discouraging use of social trails. Those on Little Moose

Island are specifically proposed for restoration (NPS 2002). The ongoing use of social trails potentially jeopardizes the integrity of buried cultural resources, particularly with the predicted slow but steady increase in visitation under all alternatives. Human-caused erosion of areas through social trail use has the potential to expose and disturb subsurface archeological deposits. Incidental encounters with undocumented cultural resources by park users may also occur with the potential for degradation (e.g., erosion and looting) and loss of important archeological data. The NPS's proposal to revegetate social trails on Little Moose Island to their native state could result in a site-specific, minor to major benefit to archeological resources, depending on their location and condition. Actual restoration activities, as well as the proposed creation of a 0.75-mile of trail on Little Moose Island, has the potential to disturb buried or surface-exposed cultural resources, resulting in negligible to minor impacts to those resources. These impacts could be mitigated to negligible by the involvement of a cultural resource specialist during trail revegetation and construction activities.

The NPS has prepared a nomination to the National Register of Historic Places to establish a historic district encompassing the entire Schoodic District minus the 100-acre former navy base and coastal islands. The nomination's focus is the cultural landscape of the Schoodic District and includes, among other things, the 6-mile Schoodic Loop Road, four hiking trails, and several developed areas dating to the 1930s and 1940s. The NPS plans to maintain the cultural landscape of the Schoodic Peninsula Historic District according to the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995). These standards provide guidance to landscape owners, managers, landscape architects, preservation planners, etc., who plan and implement project work. The proposal to prepare documentation for the proposed historic district is considered a minor to moderate regional benefit owing to its resultant preservation of the historic integrity of the Schoodic Peninsula cultural landscape and its contribution to the understanding of the historic development of Acadia National Park over the past century.

The NPS has completed a feasibility study of potential options for public transportation (e.g., buses and ferries) with the goal of reducing private automobile use. The study will help identify solutions that can reduce adverse impacts to the Schoodic Loop Road, which is an important element of the cultural landscape. Certain transportation options that may be identified in the study could have the potential to impact the cultural landscape in the future (e.g., construction of new elements such as bus pull-offs/turn-arounds, access to Schoodic Loop Road from ferry service). However, if the guidance provided by the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995) is integrated into the study, it would likely preclude consideration of options that could later negatively impact the cultural landscape.

Under all alternatives, certain lands encompassed within the potentially eligible Schoodic Peninsula Historic District, including the transportation circulation and trail systems, are proposed for rezoning from their existing "Natural Environment Subzone" of the "Natural Zone" to "Preservation Subzone" of the "Cultural Zone," an action intended to preserve significant aspects of the cultural landscape of the peninsula. The rezoning and subsequent management of these portions of the proposed historic district under the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995) would result in minor to moderate, localized to regional benefits.

The maintenance of the Schoodic Point facilities is proposed under all alternatives. The Schoodic Point facilities, including the restrooms, are remarkably unchanged since their completion and retain significant integrity of location, setting, and design, all of which reflect their historic use. The facilities exhibit integrity of materials and workmanship and NPS will maintain the structures in a manner consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995). As such, proposed maintenance activities at Schoodic Point are considered to be a negligible to minor, site-specific benefit to this element of the larger cultural landscape.



The Frazer Point picnic area and restrooms are also proposed for maintenance under all alternatives. This picnic area is included within the boundaries of the potentially eligible Schoodic Peninsula Historic District. However, because of its age, it is considered a non-contributing element to the proposed historic district itself, and only offers some help in understanding the general historic development of the Schoodic District and Acadia National Park. The majority of the site was constructed in 1964, as part of the Mission 66 program, although the restrooms are a recent addition. The picnic area includes numerous fire pits, picnic tables, informal footpaths, pumphouse, pier, etc. Maintenance activities at Frazer Point conducted in a manner which do not compromise the integrity of the potentially eligible historic district are considered short-term, negligible site-specific impacts to these Mission 66 cultural resources.

Under all alternatives, the Rockefeller Building and powerhouse located on the former navy base are proposed for zoning to "Preservation/Adaptive Use Subzone" of the "Cultural Zone." This subzone is defined as, "Use, with necessary modifications, of historically significant structures for leasing, public activities, or administrative activities and functions that perpetuate the characteristics that qualify these resources for listing in the National Register of Historic Places" (NPS 1992). The management of these structures under this zone is considered a minor, site-specific benefit to these historic structures.

Under all alternatives, maintenance/preservation proposals for properties eligible for listing in the National Register of Historic Places within the Schoodic District would adhere to the *Secretary of the Interior's Standards for the Treatment of Historic Properties (1995)* for those resources, ensuring that their eligibility status is retained. As benign neglect can result in cumulative adverse impacts to cultural resources, this effort is considered a long-term, site-specific benefit of minor to moderate intensity for the Rockefeller Building relative to 2001 conditions.

Under all alternatives, NPS would evaluate structures on the Schoodic Peninsula with the stated objective of making necessary modifications to ensure universal access to the public.

Many structures in the park, particularly within the former navy base, are not considered eligible for the National Register of Historic Places. However, for those that are, it is NPS's intent to maintain them in a manner that does not jeopardize their eligibility for listing in the National Register of Historic Places. To ensure this, all structure modifications designed to provide universal access to eligible historic structures would adhere to the *Secretary of the Interior's Standards for the Treatment of Historic Properties (NPS 1995)*. Under these standards, the proposed modifications for universal access to eligible historic structures are considered to have negligible to minor, site-specific adverse impacts to cultural resources. For the buildings that are not eligible for listing in the National Register of Historic Places, their proximity to eligible structures or cultural landscapes should be considered so as to avoid indirect adverse effects to them. Conducted in this manner, modification of ineligible structures to provide universal access is considered a negligible impact to cultural resources.

Under all alternatives, the U.S. Navy's collection at the former navy base would be conveyed to NPS. Acquisition of these data would further NPS's proposed objective of enhancing interpretive and educational visitor programs regarding the historic land use of the peninsula, including the former navy base operations. These records have traditionally been held by the U.S. Navy, limiting access to the public and park staff. As a result of the transfer, this information would now be available for new research and educational opportunities by park staff and the public, creating a minor, regional benefit to the park.

#### **Impacts of Alternative A: No Action**

**Analysis** - No major changes in management of the Schoodic District are planned under the No Action Alternative. The NPS would manage all park programming proposed for the former navy base property. Primary sources of potential impacts to cultural resources under this alternative are the slight increase in visitor (approximately 1,800 annually) and vehicular use and the use of historic structures located on the base. Approximately 20 program partici-

pants would visit the base daily. Many of the base buildings would be placed on layup status and would be protected and maintained. The current road system of the former navy property would remain unchanged.

The 6-mile Schoodic Loop Road is the focal point of the eligible Schoodic Peninsula Historic District. Its condition and appropriate maintenance are primary considerations regarding the cultural landscape of the Schoodic District. With the cessation of the navy operations at Big Moose Island in July of 2002, 350 daily vehicle trips have been eliminated along the Schoodic Loop Road. Under the No Action Alternative, it is estimated that about 20 program participants would drive (two per car) to the base daily, resulting in approximately 10 additional park-related trips a day between July and September. With the elimination of the 350 trips by navy personnel and the addition of ten seasonal trips by program participants, daily vehicular traffic would be significantly decreased along the Schoodic Loop Road compared to 2001 conditions. Because of its potential to delay the need for future major maintenance actions, this is considered a minor benefit to the cultural landscape. Under the No Action Alternative, the use of a few of the base buildings is proposed, including the Rockefeller Building. As noted above under “Common to All Alternatives,” reuse and maintenance of the Rockefeller Building would be guided by the *Secretary of the Interior's Standards for the Treatment of Historic Properties (1995)*. Adhering to the standards would keep impacts from reuse to no more than minor.

Original landscaping would not be restored on base property under this alternative. This continuing altered state of the base area may be viewed as a detraction from the larger Schoodic Peninsula cultural landscape as well as the character of the Rockefeller Building and its grounds, although because it is identical to existing conditions, has no impact relative to 2001 conditions.

**Cumulative Impacts** - Some ongoing uses of the Schoodic District may be threatening cultural resources. The projected, though small, increase in visitation under the No Action Alternative could indirectly result in degrada-

tion of more fragile aspects of the cultural landscape (e.g., trails, undocumented cultural resources). As visitor numbers and risks to cultural resources increase, so too does the need to educate and involve the public in historic preservation efforts. Since the No Action Alternative provides for few new opportunities to enlist the public's help in cultural resource preservation endeavors, cumulative adverse impacts to cultural resources are possible. However, as mitigating factors, the completion of a comprehensive cultural landscape inventory, the determination and monitoring of acceptable visitation, and the discouragement of social trail use proposed under all alternatives would provide critical information necessary for the park to avoid potential cumulative adverse effects to cultural resources within the Schoodic District. Depending on the cultural resource involved, these efforts could result in minor to major benefits.

**Conclusions** - Under the No Action Alternative, as is true for all alternatives, the proposed inventorying and monitoring of cultural resources in the Schoodic District and the subsequent use of the data to establish acceptable visitation would result in benefits ranging from minor to major, particularly for archeological resources. Revegetating social trails on Little Moose Island or elsewhere in the study area could have site-specific, minor to major benefit to archeological resources, but creating a trail could have negligible to minor impacts from disturbing them.

As with all alternatives, regional benefits ranging from minor to moderate would likely result from the Schoodic Peninsula Historic District. Rezoning lands in the proposed Schoodic Peninsula Historic District to preserve significant aspects of the cultural landscape of the peninsula and subsequent management under the *Secretary of the Interior's Standards for the Treatment of Historic Properties (1995)* would result in minor to moderate, localized to regional benefits. As is the case under all alternatives, maintenance of developed areas in the park and modifications to some structures to provide universal access would result in negligible to minor, site-specific impacts to cultural resources.

Changing the zoning to a more protective subzone and managing historic resources according to the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995) could have minor to moderate benefits for the continued integrity of the cultural resources. The standards would also keep historic building modifications from resulting in more than minor impacts.

Compared to 2001 conditions, the No Action Alternative would result in significantly fewer vehicular trips to Big Moose Island. This reduction in vehicular use is considered a minor, localized benefit to the cultural landscape of the Schoodic Peninsula, particularly to the Schoodic Loop Road. The very limited increase in visitation could result in slightly greater but unquantifiable risks to cultural resources in the area. Of the three alternatives, the No Action Alternative would result in the lowest level of visitor and vehicular use of the Schoodic District. Consequently, it is likely to pose the least risk to cultural resources.

The NPS's acquisition of the U.S. Navy's collection would be a minor regional benefit to NPS. The No Action Alternative would result in no impairment of cultural resources located at the Schoodic District.

#### **Impacts of Alternative B: National Park Service Management**

**Analysis** - The activities most likely to affect cultural resources under Alternative B are associated with the increased visitation and expanded use of former navy base property. The NPS would create and manage the facilities and programs at the Schoodic Education and Research Center on the former navy base. Educational programming would be expanded over the No Action Alternative and additional navy base buildings are proposed for use. An increase of approximately 13,500 annual visitors to the Schoodic District is expected, a significant increase over the No Action Alternative (1,800), but less than half of those projected for Alternative C (31,500). Most of these visitors would be participants in increased educational programming offered at the base. As many as 150 visitors could participate in day programs at

the base; overnight accommodations for up to 90 would be available.

Under this alternative, approximately 40 acres of disturbed landscape at the former navy base could potentially be restored, primarily through the removal of unnecessary buildings. These actions involve ground disturbance that has the potential to significantly impact buried archaeological sites, primarily through the loss of cultural context of artifacts, features, etc. Since the ground surface of the area where disturbance is planned has not been inventoried in the past, the potential exists that undocumented archeological sites could be encountered. However, structure, pavement, and landscape restoration are considered to pose a relatively low risk of affecting subsurface resources. In addition, a recent reconnaissance study (Berger & Assoc., Inc. 1999) indicated a low probability of significant archeological sites in the study area. Therefore, the impact to buried cultural resources (prehistoric or historic) of removing buildings in this alternative is likely to be no more than negligible to minor and site-specific compared to No Action (where no structures are proposed for removal). This potential impact could be mitigated to negligible by the involvement of a professional cultural resource specialist in advance of any ground-disturbing activities.

The increased availability of educational/interpretive visitor materials proposed under this alternative would focus on visitor understanding of the Schoodic District and its previous land use, including the navy base property. Visitation is projected to increase under this alternative and with it, so too does the risk of impacting archeological resources. Through appropriate informational materials, NPS can further educate and involve visitors in historic preservation efforts. The completion of a comprehensive cultural landscape inventory and the determination of acceptable visitation are complementary to the increased visitor education efforts. It is expected that an increase in educational and interpretive visitor information related to historic preservation issues would result in site-specific benefits of unknown magnitude to cultural resources, possibly ranging from negligible to moderate in intensity compared to No Action. Minor regional bene-

fits to cultural resources may also be realized through the enhanced information regarding historic land use of the Schoodic District. Similar benefits are expected under Alternative C.

When compared to the No Action Alternative, Alternative B would result in an increase in vehicular use of the Schoodic Peninsula road, as a result of an expanded SERC. The 6-mile Schoodic Loop Road is the focal point of the potentially eligible historic district on the Schoodic Peninsula and its condition and appropriate maintenance are primary considerations. With the departure of the navy base operations at Moose Island, 350 daily vehicle trips have been eliminated along the Schoodic Loop Road. Under this alternative, a general decrease in vehicular traffic of about 60 cars per day on average along the Schoodic Loop Road compared to 2001 conditions is considered a minor, localized benefit to this element of the potentially eligible historic district because it could delay the need for major maintenance actions. When compared to the No Action Alternative, Alternative B would result in about 65 additional vehicles per day and a minor increase in the probability and resulting impact of major road maintenance on the Schoodic Loop Road.

Under Alternative B, approximately 40 acres of land now covered with buildings, pavement, or asphalt would be revegetated. The removal of these buildings may provide less-obstructed views from other areas of the park, as well as a better sense of the features and layout of the original base. The benefits to visitors from restoring some of the early cultural context of the base is likely to be only negligible or minor.

Under Alternative B, the Rockefeller Building would be the focal point of the Schoodic Education and Research Center. The exterior would be preserved and the interior rehabilitated to accommodate the additional programming. Exterior and interior alterations would be conducted in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995), and, therefore, considered a minor to moderate, site-specific benefit. Alternative C proposes modifications to the Rockefeller Building which are similar in their overall effects and benefits.

The NPS proposes to landscape the Rockefeller Building consistent with the 1934 grading and planting plans. As planned, the landscape redesign around the Rockefeller Building is considered a minor, site-specific benefit to the structure as a result of the reestablishment of its original setting. Alternative C proposes similar beneficial vegetation restoration. No such restoration is proposed under the No Action Alternative.

In addition to the plans for the use of the Rockefeller Building, use or removal of other base buildings is proposed under this alternative. Even though the Rockefeller Building and powerhouse are the only structures on the base eligible for the National Register of Historic Places, all of the structures contribute something to the general historic context of base development at Big Moose Island. Their rehabilitation and reuse would further NPS's educational programming plans and are complementary to the goal of incorporating navy base history into interpretive visitor information, a possible negligible to minor benefit to cultural resources. The removal of these buildings may have a negligible to minor impact on historic resources.

**Cumulative Impacts** - Some ongoing uses of the Schoodic District may threaten cultural resources. In addition, the projected increase in visitation under Alternative B could indirectly increase the risk of degradation of more fragile aspects of the cultural landscape (e.g., trails, undocumented cultural resources). Under Alternative B, visitor information and education would be increased and enhanced, presenting new opportunities to enlist the public's help in cultural resource preservation. Such efforts could result in significant cumulative historic preservation benefits of unknown intensity. In addition, the completion of cultural resource inventories, the determination and monitoring of acceptable visitation, and the revegetation of Little Moose Island social trails proposed under all alternatives would provide critical direction necessary for the park to avoid potential cumulative adverse effects to cultural resources within the Schoodic District. These combined efforts could result in an overall beneficial effect of unknown magnitude, possibly ranging from minor to major in intensity.

**Conclusions** - Impacts common to all alternatives and summarized in "Conclusions" under No Action also apply to Alternative B. These include benefits related to the inventory of cultural resources, the establishment of appropriate visitor levels, the proposed Schoodic Peninsula Historic District, traffic reduction along the Schoodic Loop Road, use of historic preservation guidelines, and management zoning designed for historic preservation, the revegetation of Little Moose Island social trails, and the acquisition of the U.S. Navy's collection, as well as negligible or minor adverse impacts associated with structure maintenance, structure modifications to provide universal access, and new trail construction on Little Moose Island.

Structure, pavement, and landscape restoration of buildings on the base could result in negligible to minor impacts on subsurface archeological resources. Creating new trails could have impacts, which could be adverse without surveys or beneficial in providing new information and avoiding impacts if surveys are completed first. Restoration of about 40 acres and the removal of some buildings could provide less obstructed views of the base, and a better sense of the features and layout of the original base, a negligible to minor benefit to cultural resources.

Exterior and interior alterations of the Rockefeller Building would be conducted in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995), a minor to moderate, site-specific benefit. Restoring the landscape would provide minor, site-specific benefits to the historic integrity of the structure. The removal of ineligible buildings would likely have a negligible to minor impact to their remaining historic properties.

The increased availability of educational/interpretive visitor materials would result in negligible to moderate benefits; minor regional benefits are also possible.

Alternative B would result in about 65 additional vehicles per day and a minor increase in the probability and resulting impact of major road maintenance on the Schoodic Loop Road compared to the No Action Alternative. Alternative B would result in no impairment of cultural resources located at the Schoodic District.

### **Impacts of Alternative C: Collaborative Management (Preferred)**

**Analysis** - Increases in visitor and program use of park facilities, including those on the base, are the primary activities associated with impacts to cultural resources under Alternative C. The NPS would work collaboratively with partners to promote expanded educational and interpretive programming related to natural and cultural history, conservation, science, music and art. Programming would expand significantly over the No Action Alternative, but only moderately when compared to Alternative B. However, visitation would increase more dramatically. Alternative C would bring approximately 31,500 annual visitors to the Schoodic Education and Research Center and, by association, to park facilities in the study area. This is more than double that in Alternative B and a 17–18-fold increase over the No Action Alternative. As many as 350 visitors could participate in day programs at the base; overnight accommodations for up to 190 would be available.

The increased availability to visitors of educational/interpretive materials proposed under this alternative could help increase visitor understanding of the Schoodic District and its prior land use, including the navy base property. When compared to the other two alternatives, visitation is projected to increase under this proposal and, with it, so too does the risk of impacting archeological resources. Through appropriate informational materials that include cultural resource issues, NPS can further educate and involve visitors in historic preservation efforts. As with Alternative B, it is expected that an increase in educational and interpretive visitor information which includes historic preservation issues would result in an unknown, site-specific benefit to cultural resources, ranging from negligible to moderate in intensity. Minor regional benefits to cultural resources may also be realized through the enhanced information regarding the historic land use.

Under this alternative, buildings, pavement, and asphalt would be removed on approximately 16 acres, and natural vegetation allowed to regrow or planted. The removal of these structures may pose a negligible to minor, site-specific adverse impact in their potential to affect buried cultural deposits (prehistoric or historic), but

could be mitigated to negligible by the presence of a professional cultural resource specialist to monitor ground-disturbing activities.

When compared to the No Action Alternative, Alternative C would result in an increase in vehicular use of the Schoodic Peninsula roads as a result of an expanded SERC. The 6-mile Schoodic Loop Road is the focal point of the potentially eligible historic district on the Schoodic Peninsula and its condition and appropriate maintenance are primary considerations. Under this alternative, average traffic numbers will increase slightly, from 579 during 2000 when the base was occupied by the U.S. Navy, to 619 per day, as a result of increased visitation and program use of SERC. When compared to the No Action Alternative (454 trips per day), Alternative C would result in about 165 additional vehicles per day and a minor to moderate increase in the probability and resulting impact of major road maintenance on the Schoodic Loop Road.

Under Alternative C, approximately 16 acres of land now covered with buildings, pavement, or asphalt would be revegetated. The removal of buildings may provide less obstructed views from other areas of the park, as well as a better sense of the features and layout of the original base. The benefits to visitors from the restoring of some of the early cultural context of the base is likely to be only negligible or minor.

Under Alternative C, it is proposed that the exterior of the historic Rockefeller Building be preserved while its interior be rehabilitated for use by NPS and its partners. As in Alternative B, this structure would remain a focal point of park programs. Exterior and interior preservation activities would be conducted in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995). The preservation and rehabilitation of eligible historic properties is considered a minor to moderate, site-specific benefit to the structure, a similar effect to that expected under Alternative B.

As under Alternative B, this alternative includes the proposal to re-create landscaping similar to that of the original Rockefeller Building in accordance with the 1934 grading and planting plans. The action would offer minor, site-spe-

cific benefits to the overall integrity of the Rockefeller Building site. No such action is proposed under the No Action Alternative. Actions under Alternative B would result in similar benefits as those proposed under this alternative.

In addition to plans to use the Rockefeller Building, reuse of several other base buildings is proposed under this alternative. Their rehabilitation and reuse furthers the development of an education and research center. Impacts to historic resources resulting from proposed use of other navy base structures under this alternative are considered negligible, with a potential minor, localized benefit realized related to the enhancement of historical interpretive visitor information, a result similar to that under Alternative B. Negligible impacts to the Rockefeller Building are possible through the removal of ineligible structures.

**Cumulative Impacts** - Some ongoing uses of the Schoodic District threaten cultural resources. In addition, projected increases in visitation are greater under Alternative C than in the other two alternatives and could indirectly result in greater degradation of more fragile aspects of the cultural landscape (e.g., trails, undocumented cultural resources). As visitor numbers increase, so too does the need to educate and involve the public in cultural resource protection. Under Alternative C, visitor information and education would be increased and enhanced, presenting new opportunities to enlist the public's help in historic preservation efforts. Such efforts could result in significant cumulative historic preservation benefits of unknown intensity. Completion of a comprehensive cultural landscape inventory, the determination and monitoring of acceptable visitation, and the revegetation of social trails on Little Moose Island would provide critical information necessary for the park to further avoid cumulative adverse effects to cultural resources within the Schoodic District. The involvement of additional partners would enhance the capacity of NPS to maintain cultural resources. Depending on the specific cultural resource involved, these combined efforts could result in an overall beneficial effect of unknown magnitude, possibly ranging from minor to major.

**Conclusions** - Impacts common to all alternatives and summarized in "Conclusions" under No Action also apply to Alternative C. These include benefits related to the inventory of cultural resources, the establishment of appropriate visitor levels, the proposed Schoodic Peninsula Historic District, traffic reduction along the Schoodic Loop Road, use of historic preservation guidelines, and management zoning designed for historic preservation, the revegetation of Little Moose Island social trails, and the acquisition of the U.S. Navy's collection, as well as negligible or minor adverse impacts associated with structure maintenance, structure modifications to provide universal access, and new trail construction on Little Moose Island.

Structure, pavement, and removal or restoration on the base could result in negligible to minor impacts on subsurface archeological resources. Creating new trails could have impacts, which could be adverse without surveys or beneficial in providing new information and avoiding impacts if surveys are completed first. Restoration of about 16 acres and the removal of some buildings could provide less obstructed views of the base, a negligible benefit to cultural resources.

Exterior and interior alterations of the Rockefeller Building would be conducted in accordance the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995), a minor to moderate, site-specific benefit. Re-creating landscaping compatible with 1934 designs would provide minor, site-specific benefits to the historic integrity of the structure. The removal of ineligible buildings may have a negligible impact on the remaining historic properties.

The increased availability of educational/interpretive visitor materials would result in negligible to moderate benefits; minor regional benefits are also possible.

Alternative C would result in about 165 additional vehicles per day and a minor to moderate increase in the probability and resulting impact of major road maintenance on the Schoodic Loop Road compared to the No Action Alternative. However, increased participation by partners would enhance maintenance capacity. Alternative C would result in no impairment of cultural resources located at the Schoodic District.

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## IMPACTS TO VISITOR EXPERIENCE

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### Impacts Common to All Alternatives

All three alternatives call for the identification of acceptable levels of visitation over time, which may result in some restrictions regarding visitor access, especially in sensitive areas or at sites such as Schoodic Point which have the potential to reach unacceptable levels of crowding (more than 70 people at one time). Similarly, the development and use of management zones could create restrictions, and although these measures would also provide for the preservation of important resources, they could be seen as a minor to moderate adverse impact by visitors. The plan to improve the availability of information about the park could be helpful in educating people so that restrictions are accepted, and not viewed as an adverse impact.

The removal of the fence around the base area will create greater access to the base area by pedestrians. As a result of the fence removal, there could be negative long-term impacts as visitors begin to see more erosion and trampling. In addition, the appearance of the base area will be less military and more natural without the perimeter fence, a clear benefit to visitors.

The revegetation of social trails and the creation of an official maintained trail on Little Moose Island will increase the trail system of the Schoodic District, which would generally be viewed positively. The closure of some of the social trails could be a minor adverse impact for those users who have frequented those trails in the past, but improvements to other trails combined with a much better loop trail would offset the negative impact.

All three alternatives also call for allowing only low-impact recreational uses which are compatible with the quiet enjoyment of the island. This is in line with visitor surveys which found that the vast majority of visitors like the park just the way it is.

### Impacts of Alternative A: No Action

**Analysis** - Alternative A would result in the removal of few or no buildings on the base,

although perimeter fencing around the base would be eliminated, information to visitors would be available at the gatehouse, and five park employees would be located on the peninsula. These factors would increase the park-like feel of the base. However, since the base would be closed to general visitor use, the benefits of these few changes would not be widely experienced, and would therefore be negligible or minor. Also, since most buildings would be maintained and placed in layup status, the current military atmosphere in the area of the base would largely remain. Some visitors to the area would find the appearance of so many unused buildings unattractive.

The Rockefeller Building and powerhouse will simply be maintained for possible future renovation under this alternative, rather than altered inside for reuse, so there will be no short-term impact from construction noise or dust on the visitor experience.

Under this alternative, there will be no educational or interpretive programs for the general public; however, there is a projected use by school groups of approximately 20 participants per day. This will be a much smaller human presence than when the base was in operation, so it will create a quieter and more peaceful experience for those visitors who had been near the base before its closure. Since most people had little or no contact with the base, the impact to recreational visitors would be minor.

The Navy Morale, Welfare, and Recreation Division operated a campground at the former base to serve active-duty, reserve, and retired military personnel and their families. The campground consists of 14 sites (10 with full hook-ups, two with water, and two with no hook-ups). Under Alternative A, the occupancy rate of the campground would be significantly reduced. The campground would be primarily used by volunteers and researchers conducting projects in the park. This alternative would have 22 rooms or campsites available for overnight visitor use, resulting in negligible benefits to the visitor experience.

Since both peak and off-peak recreational use will likely decrease relative to 2001 conditions, there would be no overall adverse impact on the perception of crowding and trail erosion as a

result of this proposal. Because navy personnel are no longer using the Schoodic Loop Road, traffic has been reduced, especially in the early morning and late afternoon. Nearly half the visitors to Schoodic surveyed by NPS (NPS 2002) would prefer no cars on the road the day of their visit. Without base commuter traffic and the Schoodic Education and Research Center, the probability of this or of encountering only a very few cars during a trip to the peninsula would increase. Accounting for relative percentages of daily commuter and seasonal recreational traffic on the Schoodic Loop Road at Schoodic, Alternative A could result in as many as 50,000 fewer car trips or 130 on average per day than when the base was fully occupied. Although this could offer moderate or even major benefits to recreational visitors, the bulk of visitors use the roads during midday or afternoon. Therefore the benefit of fewer commuter cars is not likely to affect the average visitor experience or provide more than negligible or minor beneficial impacts to the visitor experience. Also, although few or no additional users of the park facilities at Schoodic would be present, there would be negligible beneficial impacts to those that are present on crowding during early and late off-peak hours in this alternative compared to 2001 conditions.

**Cumulative Impacts** - Visitation to the Schoodic District would likely continue to increase slowly, as will use of the entire park (U.S. Department of Transportation 2002). At about 1% per year (the steady rate of growth for the entire park since 1990), visitation to Schoodic will increase by 10–15% over the life of the plan, even with no base reuse. This will add to current crowding. Although most indicators of quality measured by surveys in 2000 and 2001 showed visitors were not experiencing the feeling of being crowded while at Schoodic, visitation to Schoodic Point did average around 70 people during midday. This is the number of people the average survey respondent felt was both unacceptable and the point at which NPS should begin restricting use. Even the slow addition of visitors to the peninsula which would take place under this alternative is likely to have a minor to moderate impact on visitors to Schoodic Point during this time of day.

Increasing visitation not related to the base reuse or any of the actions proposed in this



*Draft GMPA/EIS* will also increase the number of cars on the Schoodic Loop Road, visitation to Frazer Point (another location where visitors were surveyed on their perception of crowding) and the rate of resource damage on trails. A 10–15% increase in the number of cars on the road or visitors to Frazer Point would not have more than a minor impact on visitor experience at these locations. This is because there is a large degree of difference between current conditions and the levels at which visitors would find crowding unacceptable. However, resource damage on trails is already at the level at which visitors believe NPS should take preventive action or apply use restrictions. Additional use (10–15%) of these trails would likely result in more impact and more visitors finding that impact unacceptable.

**Conclusions** - All alternatives anticipate the use of zoning and monitoring to identify acceptable visitation, a possible minor to moderate impact on accessibility and the visitor experience. The reduction in human activity at the base relative to 2001 conditions is a minor benefit to visitors seeking a peaceful experience. Closing social trails and creating a loop trail on Little Moose Island would have relative benefits to visitors, although some may experience minor adverse impacts from closing social trails.

Negligible to minor benefits to recreational users of park facilities in the study area from a reduction in crowding at those facilities, and from reduced commuter traffic relative to 2001 conditions are likely. However, this benefit is likely to be offset by growth in visitation to Acadia National Park, which is unrelated to reuse of base facilities.

Even the slow addition of visitors to the peninsula is likely to have a minor to moderate impact on visitors to some park facilities, such as Schoodic Point and the trails to and from Schoodic Head. Less human activity at the base than under 2001 conditions will contribute to a quieter and more peaceful experience for visitors to the peninsula, a minor benefit.

Because very few or no structures will be removed, no or few short-term construction-related impacts will occur, such as noise and dust that would occur under Alternatives B and C. This is a possible negligible short-term

impact of No Action compared to 2001 conditions when the base was operated by the U.S. Navy. No impairment of the visitor experience would occur.

### **Impacts of Alternative B: National Park Service Management**

**Analysis** - Alternative B would offer a distinctly different visitor experience than the No Action Alternative. The Schoodic Education and Research Center would be established at the former navy base. Special events would open the base to the public. These events could host as many as 400 people. Although still relatively few compared to when the base was occupied by the U.S. Navy, a significant increase in the numbers of people and cars would be obvious compared to the No Action Alternative. Many structures would be removed over several years. Of all the alternatives, this alternative would involve the most revegetated landscape. Portions of the Rockefeller Building would be open to general park visitors.

The removal of up to 15 of the base buildings would have adverse impacts to both program participants and visitors to the study area within earshot of the construction. As noted above, the large majority of visitors to the peninsula now come because the area is peaceful, natural, and relatively uncrowded. For these visitors, construction noise and dust over what could be a several-year period would have major adverse impacts to their visitor experience, and may even cause them to seek other, quieter places to visit. For program participants or visitors who do not have the preconception of the peninsula as a quiet and undisturbed area, the construction noise and dust may have only moderate impacts.

In addition to noise and dust, heavy equipment vehicles would use the Schoodic Loop Road to access the base. This slow-moving construction traffic could have adverse impacts on some visitors, especially given that nearly half those surveyed (NPS 2001, 2002) indicated they would prefer to have no cars on the road other than their own, and that scenic driving was cited as the most popular activity in the park. However, unless construction involves many new vehicles using the road throughout the day, it is unlikely

that traffic density would grow from its current average of 2.8 vehicles to the 7.5 visitors felt would be unacceptable, and so the impact would likely be no more than a minor one.

Building removal would eventually lead to the revegetation of some 40 acres of disturbed landscape, which could have a minor or moderate beneficial effect on visitor experience with regards to scenic beauty, wildness, and naturalness. The former base area would eventually look more campus-like and natural than it does presently.

Under this alternative, the historic Rockefeller Building and powerhouse would be restored and retrofitted for educational and interpretive programs and could include such features as laboratories, classrooms, exhibit space, and accommodations for students and researchers. This, along with the restoration of the surrounding landscape, could have a minor to moderate localized beneficial impact on visitor perception of scenic beauty on the base. These new educational and interpretive opportunities would be seen as a beneficial impact by those visitors who felt they were lacking, and by new visitors as well, but would be seen as an adverse impact by those visitors who wanted the base to stay exactly as it is. During the actual restoration and renovation process, however, there could be the same types of temporary adverse impacts on visitor experience from noise and dust described above for building removal. Because these impacts would last for a shorter period of time, they would likely be short-term, minor or moderate in nature.

A reduction in vehicle traffic from the baseline year of 2001 (when navy personnel were still commuting to the base) could have a beneficial effect on visitor experience with regards to the perceptions of solitude and naturalness. However, since the loss of commuter traffic would occur at times of the day when visitors are not using the peninsula, and since construction traffic could be the highest for this alternative, the benefit is likely to be only a negligible or minor one. Compared to the No Action Alternative, Alternative B is likely to increase traffic by about 5,000 vehicles per year. During the summer months, when traffic is more concentrated, the increase in program participants

could add 40–50 cars per day to the Schoodic Loop Road, a 9–11% increase. Since these would be visitors, rather than commuters, the chances they would be on the road during mid-day or afternoon are greater, as are the chances they would adversely affect the visitor experience of crowding on the road. However, the loss of commuter vehicles would mitigate this increase, and an 11% increase would not bring midday traffic near to levels where volume is considered unacceptable.

The increase in both day use and overnight guests using former base lodging could have an adverse impact on crowding during peak as well as early and late off-peak hours, especially if program participants are taken out in large groups to view key park sites. If program participants are taken to these popular sites during peak-use times, the level of crowding could increase past the point which survey respondents felt was tolerable. At Schoodic Point, visitation at peak-use times is already above the level people find acceptable, and the addition of even a few more visitors at these times would increase crowding to the point at which respondents felt use should be restricted. This would create a major adverse impact for visitors to Schoodic Point, since it is the most popular area in the park, and since crowding is such an important issue to visitors. Schoodic Point is also within easy walking distance of the former navy base, and so is likely to be a favorite site to visit or study.

At Frazer Point, counts indicated that 20–25 people were present at peak-use times. This is slightly below the level which people indicated they would prefer (35.3 people at one time), and is well below "acceptable" and "tolerable" levels. It is therefore less likely that use by program participants would have more than minor impacts at Frazer Point.

Although the overnight use will be less than in 1999 when navy personnel were still on the base, it will be much greater than under the No Action Alternative. Overnight visitor use would create more nighttime illumination in the area of the base, but the effect on visitor experience of the night sky would probably be negligible.

Changes in parking and circulation designed to make the park more hospitable to pedestrians could have a minor beneficial impact on visitor experience with regards to wildness and naturalness, since fewer cars would be in circulation in some areas. If parking information is made available at the entrance to the park, and trail-heads are clearly marked, the benefits would be greater.

A recent survey conducted by NPS of visitors to Schoodic (Manning et al. 2002) asked those using park trails about resource damage there. Most indicated existing resource damage was fairly high and believed it was the upper limit of damage NPS should allow. Creating trails to connect the former navy base to the Schoodic Head trail system could provide benefits in reducing the need to drive to trailheads. This increase in accessibility would help to mitigate erosion on existing trails, but would require education through signs, brochures, or other means, and erosion control in some cases to prevent existing moderate impacts to the visitor experience on Schoodic Head trails from becoming major ones.

Although NPS does not plan to promote the Schoodic District per se, increased availability of information, as well as the word-of-mouth promotion which could occur after program participants get to see the park, could actually result in growth in visitor use that is beyond the current projection of 1% annually. If educational and interpretive programs turn out to be more popular than expected and grow accordingly, impacts on crowding at park facilities and trails in the study area will also increase in severity.

**Cumulative Impacts** - The cumulative impacts identified above for the No Action Alternative would apply to Alternative B as well.

**Conclusions** - All alternatives anticipate the use of zoning and monitoring to identify acceptable visitation, a possible minor to moderate impact on accessibility and the visitor experience. The reduction in human activity at the base relative to 2001 conditions is a minor benefit to visitors seeking a peaceful experience. Closing social trails and creating a loop trail on Little Moose Island would have relative benefits to visitors,

although some may experience minor adverse impacts from closing social trails.

Alternative B would result in increased human activity at the base, and an increase in the perception of crowding at park facilities, trails and roads relative to No Action. Noise and dust associated with the removal of up to 15 of the base buildings could have moderate to major impacts on visitors to the peninsula. Minor to moderate benefits to visitor experience from the restoration of about 40 acres on the base to natural conditions is also likely. The use of the Schoodic Loop Road by construction vehicles could have additional minor impacts to visitors who have sought out the peninsula for quiet, scenic driving.

Rehabilitation of the Rockefeller Building would have short-term minor to moderate adverse impacts on visitor perception of wildness, naturalness, and peace and quiet during the actual renovation process, but would have long-term minor to moderate beneficial impacts on these same indicators after restoration.

Reductions in traffic related to base closure would provide negligible to minor benefits to visitors seeking a solitude experience, but increases related to program use would have minor adverse impacts on traffic volumes compared to the No Action Alternative.

Growth in visitation could also create minor to moderate adverse impacts on visitor perception of crowding at popular park sites in the study area. Increased visitor and program participant use of trails would increase perceptions of crowding and erosion; these would be somewhat offset by comprehensively integrating and adding to trails in the study area, although more intense mitigation is needed to prevent existing moderate impacts on some trails from become major ones. Greater overnight use compared to No Action would have minor impacts on the visitor experience of a natural night sky.

Changes in parking and circulation designed to make the park more hospitable to pedestrians could have a minor beneficial impact on visitor experience. No impairment of the visitor experience would occur.

### **Impacts of Alternative C: Collaborative Management (Preferred)**

**Analysis** - The changes in the visitor experience described under Alternative B would occur in even more dramatic fashion in Alternative C. A significant feature of Alternative C is the option for alternative uses such as retreats, conferences, and special events. These types of activities could presumably bring large numbers of people into the base area at once. Visitors who are new to the park, as well as some current visitors, may well find these events fun and enjoyable. It is conceivable, however, that visitors who were accustomed to the park's quiet and solitude might be significantly adversely impacted by these currently unspecified events, although high levels of use at the base existed during the 2001 survey when most visitors were satisfied with the park as it was.

Under this alternative, fewer structures would be removed than in Alternative B, but more than in the No Action Alternative. Because removal could take less time, the noise and dust impacts relative to Alternative B would also be reduced. For the large majority of visitors to the peninsula who now come seeking a peaceful, quiet experience, the impact of construction compared to No Action would be moderate to major. For program participants or visitors who do not have the preconception of the peninsula as a quiet and undisturbed area, the construction noise and dust may have only minor or moderate impacts. Impacts from construction traffic would also be less severe, and may only have negligible to minor impacts on visitors who come to Schoodic for a scenic driving experience.

Although construction impacts would not last as long, Alternative C would also not create as much open space through removal of buildings as Alternative B. Only about 16 acres of land would be restored to natural conditions, a negligible to minor beneficial impact on the visitor experience of the base compared to No Action.

Under this alternative, the historic Rockefeller Building and powerhouse would be restored and retrofitted for educational and interpretive programs and could include such features as laboratories, classrooms, exhibit space, and accommodations for students and researchers.

This, along with the restoration of the surrounding landscape, could have a minor to moderate localized beneficial impact on visitor perception of scenic beauty on the base. During the actual restoration and renovation process, however, there could be the same types of temporary adverse impacts on visitor experience from noise and dust described above for building removal. Because these impacts would last for a shorter period of time, they would likely be short-term minor or moderate in nature.

Compared to No Action, there would be an increase in traffic of about 10,000 vehicles per year. Since almost a third of the annual vehicles are present during the summer months, this could mean as many as 100 more cars per day. Since visitor counts showed that people entered the park between 8:00 a.m. and 8:00 p.m. and that most visitors came between 10:00 a.m. and 2:00 p.m., this translates to about 7.3 more cars on the road on average throughout the day, with numbers being greater at midday. Additional visitation not related to the Schoodic Education and Research Center would add to these traffic counts, and commuter trips related to base closure could reduce them somewhat, although commuter traffic does not generally occur at the same time as peak visitation. Since visitors saw 2.8 cars on the road in 2001, and would tolerate no more than 7.8, it is quite probable that traffic will exceed the level of tolerance for visitors at midday during the peak season. This would be a moderate to major impact with regards to traffic. This impact could be reduced with the expansion of the ferry and other public transportation.

An increase in program participants of this magnitude, including up to 190 overnight guests, could have major impacts on crowding and the visitor experience at popular park facilities in the study area, both during peak and off-peak hours. Since the former navy base is within easy walking distance of Schoodic Point, it may be particularly affected. Visitation to Schoodic Point is already above the level which people find acceptable, and the addition of even a few more people at these times would increase crowding to the point at which people felt use should be restricted. This would create a major adverse impact for visitors to Schoodic Point, since it is the most popular area in the park, and since crowding is such an important issue to visitors.

At Frazer Point, counts indicated that 20–25 people were present at peak-use times. This is slightly below the level which people indicated they would prefer (35.3 people at one time), and is well below "acceptable" and "tolerable" levels. The addition of 350 program participants per day, many of whom will seek developed sites such as Frazer or Schoodic Point during their stay, could increase crowding to levels beyond which those surveyed indicated they would prefer, but is not likely to increase it to beyond acceptable levels, and so is a moderate impact.

Greater numbers of overnight guests could also result in more artificial illumination at night, and could have a minor adverse impact on views of the night sky compared to No Action.

Changes in parking and circulation designed to make the park more hospitable to pedestrians could have a minor beneficial impact on visitor experience by creating a campus-like and natural feel, since fewer cars would be in circulation in some areas. If parking information is made available at the entrance to the park, and trailheads are clearly marked, the benefits would be greater.

An increase in the use of trails in the study area could result in major impacts to the visitor experience on those trails, as a recent survey (NPS 2001, NPS 2002) indicated most respondents believe erosion and damage to vegetation on Schoodic Head trails is already at the limit of what NPS should allow.

Although visitation is expected to increase by 1% per year, there will be greater numbers of program participants than with Alternative B, so this growth could increase beyond this projection as people return with friends and promote the park through word-of-mouth. The resulting impacts to park facilities and trails would be greater as a result.

**Cumulative Impacts** - The same cumulative impacts as identified above for No Action would apply to Alternative C.

**Conclusions** - All alternatives anticipate the use of zoning and monitoring to identify acceptable visitation, a possible minor to moderate impact on accessibility and the visitor experience. Use of design guidelines would improve the campus-

like feel of the base, a minor benefit. The reduction in human activity at the former navy base relative to 2001 conditions is a minor benefit to visitors seeking a peaceful experience. Closing social trails and creating a loop trail on Little Moose Island would have relative benefits to visitors, although some may experience minor adverse impacts from closing social trails.

Alternative C would result in increased human activity at the base, and an increase in the perception of crowding at park facilities, trails, and roads relative to No Action. Noise and dust associated with the removal of up to 5–10 of the base buildings could have minor to major impacts on visitors to the peninsula. Negligible to minor benefits to the visitor experience from the restoration of about 16 acres on the base to natural conditions is also likely. The use of the Schoodic Loop Road by construction vehicles could have additional negligible to minor impacts to visitors who have sought out the peninsula for quiet, scenic driving.

The rehabilitation of the Rockefeller Building would have short-term minor to moderate adverse impacts on visitor perception of wilderness, naturalness, and peace and quiet during the actual renovation process, but would have long-term minor to moderate beneficial impacts on these same indicators after restoration.

Reductions in traffic related to base closure would provide negligible to minor benefits to visitors seeking a solitude experience, but increases related to program use would have moderate to major adverse impacts on traffic volumes compared to the No Action Alternative. Growth in visitation could also create moderate to major adverse impacts on visitor perception of crowding at popular park sites in the study area. Increased visitor and program participant use of trails would increase perceptions of crowding and erosion. Greater numbers of overnight guests could result in a minor adverse impact on views of the night sky compared to No Action.

Changes in parking and circulation designed to make the park more hospitable to pedestrians could have a minor beneficial impact on visitor experience by creating a campus-like and natural feel. No impairment of the visitor experience would occur.

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## IMPACTS TO SOCIOECONOMIC ENVIRONMENT

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### Visitor Impacts from Acadia National Park

In 2000, Daniel Stynes and Dennis Propst at Michigan State University developed the Money Generation Model Version 2 (MGM2) based on a National Park Service economic model that estimates the economic benefits of national parks for regional economies (Stynes et al. 2000). MGM2 estimates the impacts that park visitors have on the local economy in terms of their contribution to sales, income, and jobs in the area. Stynes et al. expanded the original model to include the economic effects of NPS salaries, park construction projects, and other park-related activities; and expenditures by other outside parties, such as state spending for park access roads and dollars spent by outside interests for marinas, motels, restaurants, and other park-related capital development projects. The economic model produces quantifiable measures of park economic benefits that can be used for planning, concessions management, budget justifications, policy analysis, and marketing.

### Impacts Common to All Alternatives

In 2001, recreation visits to Acadia National Park totaled 2.52 million. According to *Economic Impacts of Selected National Parks; Update to Year 2001* (Stynes and Sun 2002), local day visitors contributed 5% of overall recreation visits, day visitors from other regions 25%, and visitors staying at lodges and campsites were 60% and 10%, respectively. The 2.52 million recreation visits were converted to 820,000 party days (the number of days each visitor party spends in the local region based on an average of three people per visitor party), which was the spending unit in the MGM2 analysis. On average, visitors spent \$165 per party per day at the local area. Total visitor spending was estimated to be \$134.85 million in 2001.

The \$134.85 million spent by visitors to Acadia had a direct economic impact of \$116.02 million in sales, \$41.05 million in personal income (wages and salaries), \$61.60 million in value added, and 2,830 jobs. Among all sales, \$50.65 million was from the lodging sales, \$29.17 mil-

lion from food and drinking places, \$11.86 million from admission fees, and \$12.97 million from the retail trade. As visitor spending circulates through the local economy, secondary effects created additional \$19.64 million in personal income and 765 jobs. In summary, visitors to Acadia spent \$134.85 million dollars in 2001, which supported a total of \$170.12 million in sales, \$60.69 million in personal income, \$95.52 million in value added (the sum of employee compensation, proprietary income, and indirect business tax), and 3,594 jobs (Stynes and Sun 2002).

Assuming a steady rate of growth of 1% annually with 2.52 million recreation visits in 2001 as the basis, an additional 406,000 annual recreation visits are projected for Acadia by 2015. The additional 406,000 recreation visits can be converted to 132,000 party days according to the MGM2 formula. Assuming visitors to Acadia spend \$165 dollars per party per day at the local area, total visitor spending would increase by \$21,780,000 (current value) by 2015. This new spending would support an annual total of \$27.48 million in sales, \$9.80 million in personal income, \$15.43 million in value added, and 580 jobs.

In estimating the economic impact of the three alternatives, it is assumed that additional benefits would accrue from attracting visitors to new programs and activities at the Schoodic District beyond the projected increase in park visitation.

### Impacts of Alternative A: No Action

**Analysis** - As noted above, Acadia's annual recreation visits are projected to increase by 1% per year from 2001 to 2015, which will result in the corresponding economic benefits described above. In addition, this alternative would attract about 1,800 visitors to park programs and activities annually.

Assuming that half the 1,800 visitors would be visiting Acadia National Park in any case, there would be a net of 900 new visitors drawn to the park by the programs and activities at Schoodic. Assuming that the 900 new visitors would spend an average of \$55 per person per day for three days, Alternative A would increase annual visi-

tor spending by \$148,500 (current value) by 2015. This new spending would support an annual total of \$187,000 in sales, \$67,000 in personal income, \$105,000 in value added, and 4 jobs. The benefits of this alternative would be negligible.

Additional economic benefits of unknown magnitude from the spending of salaries for employees at Schoodic and from the secondary effects of visitor spending would occur in the local community. Staff may occupy housing vacated by navy personnel upon closure of the base, with a resulting negligible benefit to the rental or housing market locally. If they reside in the community, the local unemployment rate will decrease very slightly.

**Cumulative Impacts** - The gain in economic prosperity associated with a small program staff and 1,800 participants, as well as the increase in visitation expected regardless of the alternative, is completely offset by the adverse impact to the local economy as a result of base closure by the U.S. Navy. In the FY 1997, the Naval Security Group Activity Winter Harbor employed 505 enlisted and civilian personnel, with over 300 living in nearby towns, including military housing in Winter Harbor. The total payroll of the navy facility was \$10,900,000.

A recent study completed by the University of Maine (Gabe and Allen 2000) indicates impacts to the local community's economy related to the spending of this payroll are likely. The indirect impact of the base closing includes the decrease in spending by the U.S. Navy at local businesses and subsequent decreases in purchases made by these businesses at other enterprises in Hancock County. This amount was estimated by University of Maine analysts to be \$1,823,351 annually, with a one-time loss of 90 jobs. The induced economic impact results in a decrease in personal income to other workers in Hancock County, which was estimated to be \$3,957,206 annually, with a one-time loss of 196 jobs. According to the University of Maine study, Hancock County is being faced with a total economic impact of \$16,680,557 due to the closing of the navy base.

In addition to direct economic losses, navy personnel occupied many social niches in the

community, including as parents of school-aged children, sports coaches, church attendees, and other important roles. Approximately 70–75 children of base personnel attended local schools, and more than 80% lived off base (NPS 2002 visitor survey) in Winter Harbor and other local communities. Infrastructure, such as water, sewer, roads, power, etc., was sized to some degree to accommodate 350–500 base personnel. Housing was also rented or purchased by navy personnel. The closing of the base had adverse impacts on all of these economic and social factors for the community.

**Conclusions** - Increases in visitation to Schoodic independent of the reuse scenario would bring negligible benefits to the local economy. The addition of 1,800 annual program participants and four jobs to the region would result in additional negligible benefits to the economy in the form of increased spending, a slight reduction in unemployment, and a possible slight reduction in housing vacancy. These small benefits would be outweighed by significant adverse impacts to spending, jobs, personal income, community infrastructure, housing, schools, and the social fabric of the region resulting from base closure by the U.S. Navy.

#### **Impacts of Alternative B: National Park Service Management**

**Analysis** - As noted above, Acadia's annual recreation visits are projected to increase by 1% per year from 2001 to 2015, which will result in the corresponding economic benefits described above. In addition, this alternative would attract about 13,500 new visitors to park programs and activities annually at the Schoodic Education and Research Center.

Assuming that half the 13,500 visitors would be visiting Acadia National Park in any case, there would be a net of 6,750 new visitors drawn to the park by the programs and activities at the Schoodic Education and Research Center. Assuming that the 6,750 new visitors would spend an average of \$55 per person per day for three days, Alternative B would increase annual visitor spending by \$1.11 million (current value) by 2015. This new spending would support an annual total of \$1.41 million in sales, \$501,000 in

personal income, \$789,000 in value added, and 30 jobs. This would represent a minor benefit (5%) over visitor spending for Alternative A.

Additional economic benefits of unknown magnitude from the spending of salaries for employment at Schoodic and from the secondary effects of visitor spending would occur in the local community. Staff may occupy housing vacated by the navy personnel upon closure of the base, with a resulting negligible to minor benefit to the rental or housing market locally. If they reside in the community, the local unemployment rate will decrease slightly.

**Cumulative Impacts** - The same adverse impacts identified under No Action for base closure would apply to Alternative B as well. However, Alternative B would go further in mitigating these adverse impacts by adding more program participants and staff than Alternative A.

**Conclusions** - Increases in visitation to Schoodic independent of the reuse scenario would bring minor benefits to the local economy. The addition of 13,500 annual program participants and 30 jobs to the region would result in additional minor benefits to the economy relative to 2001 conditions in the form of increased spending, a slight reduction in unemployment and a possible slight reduction in housing vacancy. Minor benefits to the local economy and to local schools, housing, unemployment, and social facets of the community relative to No Action are possible. While socioeconomic benefits of Alternative B would be outweighed by the adverse impacts from base closure, Alternative B would go further in reversing overall losses in spending.

#### **Impacts of Alternative C: Collaborative Management (Preferred)**

**Analysis** - As noted above, Acadia's annual recreation visits are projected to increase by 1% per year from 2001 to 2015, which will result in the corresponding economic benefits described above. In addition, this alternative would attract about 31,500 new visitors to park programs and activities annually at the Schoodic Education and Research Center.

Assuming that half the 31,500 visitors would be visiting Acadia National Park in any case, there would be a net of 15,750 new visitors drawn to the park by the programs and activities at SERC. Assuming that the 15,750 new visitors would spend an average of \$55 per person per day for three days, Alternative C would increase annual visitor spending by \$2.60 million (current value) by 2015. This new spending would support an annual total of \$3.29 million in sales, \$1.17 million in personal income, \$1.84 million in value added, and 69 jobs. This would represent a moderate benefit (12%) over visitor spending for Alternative A.

Additional economic benefits of unknown magnitude from the spending of salaries for employees at Schoodic and from the secondary effects of visitor spending would occur in the local community. Staff may occupy housing vacated by navy personnel upon closure of the base with a resulting negligible to moderate benefit to the rental or housing market locally. If they reside in the community, the local unemployment rate will decrease as well.

**Cumulative Impacts** - The same adverse impacts identified under No Action for base closure would apply to Alternative C as well. The University of Maine noted that the closing of the navy base would have a total negative economic impact of \$16,680,557. The payroll was \$10,900,000. There will be a decrease in spending by the U.S. Navy at local businesses and subsequent purchases by those businesses of \$1,823,351. This spending decrease in the community will have an induced economic impact of a decrease of \$3,957,206 in personal income to other workers in Hancock County.

Alternative C is expected to add \$2.6 million in spending and as many as 69 new jobs to the region. It would offset some of the loss of the U.S. Navy spending and could have moderate positive impacts on unemployment, housing, vacancies, and the unfilled capacities of community infrastructure, schools, and the fabric of the region.

**Conclusions** - Increases in visitation to Schoodic independent of the reuse scenario would bring negligible to minor benefits to the local economy. The addition of 31,500 annual program participants and 69 jobs to the region



would result in moderate benefits to the economy both relative to 2001 conditions and the No Action Alternative in the form of increased spending, a slight reduction in unemployment, and a possible slight reduction in housing vacancy. Moderate benefits are possible for the local economy and to the local schools, housing, unemployment, and social facets of the community relative to No Action. This alternative would offset part of the economic loss related to base closure and offer additional benefits in direct and indirect spending.

**TABLE 10. SUMMARY OF IMPACTS (SHEET 1 OF 6)**

Activity	Alternative A: No Action	Alternative B: NPS Management	Alternative C: Collaborative Management (preferred)
<b>AIR QUALITY</b>			
Implementation of public transportation	Minor local benefit	Same as No Action	Same as No Action
Study of expanded bicycle connections along the Schoodic Loop Road	Minor local benefit	Same as No Action	Same as No Action
Limiting parking in the park; informing visitors at entrance	Minor benefit	Same as No Action	Same as No Action
Use of base structures containing < 1% asbestos	Negligible adverse impact	Similar to No Action but slightly higher risk as more buildings would be occupied	Similar to No Action but slightly greater risk than other two alternatives as more buildings would be occupied
Reductions in vehicular use at Schoodic and in the use of boilers on the base	Major local benefit compared to year 2001; negligible regional benefit	Minor increase in emissions compared to No Action	Minor to moderate increase in emissions compared to No Action
<b>WATER RESOURCES</b>			
Changes in use/demand for drinking water	Negligible to minor benefit to groundwater resources from reduced demand compared to 2001 conditions	Negligible to minor impacts to groundwater resources compared to No Action	Negligible to minor impacts to groundwater resources but greater than Alternative B
Changes in wastewater discharge	Moderate to major benefit to water quality in Arey Cove from reduced discharge compared to 2001 conditions	Unknown, but possibly moderate adverse impact to Arey Cove water quality. Increased discharge compared to No Action	Unknown, but possibly moderate to major adverse impact to Arey Cove water quality
Soil erosion, petroleum products from vehicles	Negligible to minor adverse impacts to surface waters	Same as No Action	Same as No Action
<b>SOILS</b>			
Revegetation of social trails on Little Moose Island (soil stabilization)	Minor localized benefit	Same as No Action	Same as No Action
Creation of 0.75 mile of trail on Little Moose Island	Negligible to minor adverse impacts	Same as No Action	Same as No Action
Erosion caused by general increase in use of Schoodic (with no other changes)	Moderate to major cumulative impacts	Same as No Action	Same as No Action
Reductions in erosion due to visitor use controls in critical habitats	Benefit of unknown magnitude	Same as No Action	Same as No Action
Reduction of fuel storage, vehicle maintenance, hazardous material handling	Minor to moderate local benefit	Same as No Action	Same as No Action
Changes in levels of trail use (new program participants)	Minor benefit to soils compared to ongoing moderate adverse impacts under 2001 conditions	Negligible to minor adverse impacts compared to No Action	Minor adverse impacts compared to No Action
Increased use of peninsula trails by visitors (cumulative impact)	Increase existing impacts from moderate to major	Same as No Action	Same as No Action

**TABLE 10. SUMMARY OF IMPACTS (SHEET 2 OF 6)**

Activity	Alternative A: No Action	Alternative B: NPS Management	Alternative C: Collaborative Management (preferred)
<b>SOILS (continued)</b>			
Removal of base structures; landscape revegetation	No effect (no structure removal/ landscape revegetation proposed)	Major localized benefit to soils (40 acres revegetated)	Moderate localized benefit to soils (16 acres revegetated)
<b>VEGETATION</b>			
Inventory/monitoring of natural resources, determination of acceptable visitation levels, use of management zoning	Major localized benefits for vegetation on Little Moose Island, minor to moderate benefits in other currently less disturbed vegetative communities	Same as No Action	Same as No Action
Revegetation of social trails on Little Moose Island and creation of a 0.75 mi. trail	Major local benefits for patches of rare plants and coastal headland vegetation	Same as No Action	Same as No Action
Monitoring/control of aggressive non-native plants	Minor benefit for freshwater wetlands on the peninsula	Same as No Action	Same as No Action
Acquisition of a conservation easement to the north of the existing Schoodic District	Minor to major benefits to forest vegetation on the peninsula	Same as No Action	Same as No Action
Removal of unused structures (e.g., fencing) in the study area	Minor to moderate localized benefits to vegetation	Same as No Action	Same as No Action
Removal of base buildings; vegetation restoration	No effect (no building removal, vegetation restoration proposed)	Major local benefit (40 acres restored)	Moderate local benefit (16 acres restored)
Changes in level of trail use (new program participants)	Moderate benefits to vegetation relative to 2001 use (very few program participants)	Negligible impacts with limited trail use in fragile areas	Negligible impacts with limited trail use in fragile areas
Increased visitor use of study area trails (cumulative impact)	Could increase current impacts to vegetation from moderate to major unless mitigated	Same as No Action	Same as No Action
<b>COASTAL RESOURCES</b>			
Inventory/monitoring of natural resources, determination of acceptable visitation levels, management zoning, appropriate visitor information	Minor to moderate benefits to coastal resources in intertidal areas of the peninsula; moderate or major localized benefits for common eiders and other nesting seabirds	Same as No Action	Same as No Action
Revegetation of social trails on Little Moose Island and creation of a 0.75 mi. trail	Moderate localized benefits for coastal vegetation	Same as No Action	Same as No Action

**TABLE 10. SUMMARY OF IMPACTS (SHEET 3 OF 6)**

Activity	Alternative A: No Action	Alternative B: NPS Management	Alternative C: Collaborative Management (preferred)
<b>COASTAL RESOURCES (continued)</b>			
Addition of new educational programs	Negligible benefit (minimal programming)	Moderate or major localized impacts to intertidal area	Same as Alternative B
Unrestricted use of intertidal areas by program participants	Negligible to minor benefits to common eiders and other seabirds relative to 2001 conditions	Moderate to major local impacts to a variety of resources; impacts to common eiders and other seabirds additive and adverse unless mitigated	Same as Alternative B, with major impacts more likely
<b>WILDLIFE</b>			
Inventory/monitoring of natural resources, determination of acceptable visitation levels, management zoning	Major localized benefits for wildlife, including the federally threatened bald eagle	Same as No Action	Same as No Action
Acquisition of a conservation easement to the north of the existing Schoodic District	Minor to major benefits to wildlife	Same as No Action	Same as No Action
Implementation of public transportation	Negligible to minor benefits for wildlife	Same as No Action	Same as No Action
Base building removal, vegetation restoration	No effect (no building removal or restoration proposed)	Minor, localized benefit to wildlife (40 acres restored)	Negligible to minor benefit to wildlife (16 acres restored)
Program use	Possible unknown benefits of fewer people related to base closure	Minor to moderate impacts if use is unregulated; no more than minor if restricted; minor to moderate impacts to nocturnal mammals	Minor to moderate impacts if use is unregulated; no more than minor if restricted; moderate impacts to nocturnal mammals
Increased visitor use of study area (cumulative impact)	Negligible to minor adverse effect in vicinity of trails	Same as No Action	Same as No Action
<b>CULTURAL RESOURCES</b>			
Inventory/monitoring of cultural resources, determination of acceptable visitor levels	Minor to major benefits to cultural resources	Same as No Action	Same as No Action
Revegetation of social trails on Little Moose Island	Minor to major, site-specific benefits to archeological resources	Same as No Action	Same as No Action

**TABLE 10. SUMMARY OF IMPACTS (SHEET 4 OF 6)**

Activity	Alternative A: No Action	Alternative B: NPS Management	Alternative C: Collaborative Management (preferred)
<b>CULTURAL RESOURCES (continued)</b>			
Ground disturbance related to trail revegetation and construction of a new 0.75-mile trail on Little Moose Island	Negligible to minor impacts to archeological resources	Same as No Action	Same as No Action
Nomination of proposed Schoodic Peninsula Historic District to the NRHP, rezoning as "Preservation Subzone"	Minor to moderate benefits to cultural resources, local to regional in scope	Same as No Action	Same as No Action
Maintenance activities at Schoodic Point in accordance with the <i>Secretary of the Interior's Standards</i>	Negligible to minor, site-specific benefits	Same as No Action	Same as No Action
Zoning of the Rockefeller Building and powerhouse as "Preservation/Adaptive Use Subzone" of the "Cultural Zone"	Minor, site-specific benefits to these historic structures	Same as No Action	Same as No Action
Maintenance and preservation of exterior of Rockefeller Building in accordance with the <i>Secretary of the Interior's Standards</i>	Minor to moderate, site-specific benefit	Same as No Action	Same as No Action
Retrofitting of potentially NRHP-eligible structures for universal access in accordance with the <i>Secretary of the Interior's Standards</i>	Negligible to minor, site-specific impacts to cultural resources	Same as No Action	Same as No Action
Acquisition of navy archives and collections by the NPS for use in interpretive and educational visitor programs	Minor, regional benefit to cultural resources	Same as No Action	Same as No Action
Changes in traffic volumes	Minor benefit to cultural landscape	Minor impacts to cultural landscape, particularly Schoodic Loop Road	Minor to moderate impacts to cultural landscape, particularly Schoodic Loop Road
Base building removal	No effect (no building removal proposed)	Negligible to minor	Same as Alternative B
Vegetation restoration	No effect (no restoration proposed)	Negligible or minor benefit to the cultural landscape of the potentially eligible Schoodic Peninsula Historic District	Same as Alternative B

**TABLE 10. SUMMARY OF IMPACTS (SHEET 5 OF 6)**

Activity	Alternative A: No Action	Alternative B: NPS Management	Alternative C: Collaborative Management (preferred)
<b>CULTURAL RESOURCES (continued)</b>			
Increased visitor information related to historic preservation	No effect (no increased information proposed)	Negligible to moderate benefits to cultural resources	Same as Alternative B
Landscaping sympathetic to 1934 design around the Rockefeller Building	No effect (no landscaping proposed)	Minor, site-specific benefit	Same as Alternative B
Rehabilitation and reuse of ineligible base structures	No effect (no rehabilitation and reuse proposed)	Negligible to minor benefits to cultural resources	Same as Alternative B
<b>VISITOR EXPERIENCE</b>			
Determination of acceptable levels of visitation, implementation of management zoning (limiting access)	Minor to moderate adverse impact to visitor experience	Same as No Action	Same as No Action
Removal of fencing around the base (greater access)	Minor benefit	Same as No Action	Same as No Action
Revegetation of social trails and construction of a maintained trail on Little Moose Island	Minor benefits to visitors; minor adverse impacts for those who frequent these social trails	Same as No Action	Same as No Action
Increase in visitor use	Minor to moderate impacts at Schoodic Point and trails around Schoodic Head at midday, minor impacts at Frazer Point	Major impacts for visitors to Schoodic Point at midday; minor impacts at Frazer Point	Major impacts for visitors to Schoodic Point at midday; moderate impacts at Frazer Point
Overnight visitor use	Negligible impacts on views of night sky at the base	Same as No Action	Minor adverse impacts on views of the night sky at the base
Changes in traffic volume	Negligible or minor benefits	Negligible or minor benefits	Moderate to major impacts
Slow-moving construction traffic (building removal and renovation, etc.)	No effect (no building removal proposed)	Minor impacts to Schoodic Loop Road	Negligible to minor impacts to Schoodic Loop Road
Creation of more natural feel of base area	No effect (negligible base modifications proposed)	Minor benefits	Same as Alternative B
Level of human presence in the Schoodic District	Minor benefit on visitor perception of quiet and solitude	Negligible to minor impacts on visitor perception of quiet and solitude	Same as Alternative B
Building removal and renovation	No effect (no building removal proposed)	Moderate to major, short-term impacts from noise and dust (15 buildings removed)	Minor to major, short-term impacts (5–10 buildings removed)

**TABLE 10. SUMMARY OF IMPACTS (SHEET 6 OF 6)**

Activity	Alternative A: No Action	Alternative B: NPS Management	Alternative C: Collaborative Management (preferred)
<b>VISITOR EXPERIENCE (continued)</b>			
Restoration of landscape	No effect (no restoration proposed)	Minor or moderate benefits to visitors (40 acres restored)	Negligible to minor benefit to visitors (16 acres restored)
Rehabilitation of Rockefeller Building	No effect (no rehabilitation proposed)	Minor to moderate localized benefits on visitor experience	Same as Alternative B
Improvements to base parking and circulation	No effect (no improvements)	Minor benefits for visitors	Major benefits
<b>SOCIOECONOMIC ENVIRONMENT</b>			
Increase in visitor use, program participants, and staff	Negligible benefit to socioeconomic environment (1,800 participants/year, 5 staff)	Minor benefit to socioeconomic environment (13,500 participants/year; 30 staff)	Moderate benefit to socioeconomic environment (31,500 participants/year; 60 staff)
Employee and visitor spending in nearby communities	Benefits of unknown magnitude	Same as No Action	Same as No Action
Rental of housing by parks staff	Negligible benefit to the local economy	Negligible to minor benefit to the local economy	Same as Alternative B with slightly increased benefits

\* No impairment of any NPS resource or value would occur in any alternative